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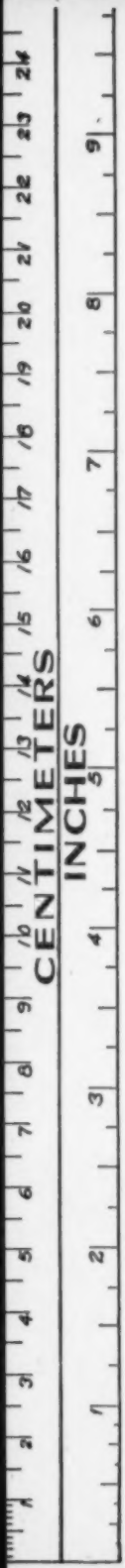

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AMERICAN ANTIQUITY

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THE DENBIGH FLINT COMPLEX

J. L. GIDDINGS, JR.

A THIN layer of pebbles and flinty artifacts isolated during the summers of 1948 and 1949 at the bottom of a site on Cape Denbigh, on the north Bering Sea coast of Alaska, furnishes concrete evidence in support of theories of a Bering Strait gateway to America in remote times. The flint complex from the old layer holds little in common with what we think of as Eskimo. For descriptive parallels it will be necessary to draw upon sources far removed from the Bering Strait and out of the general range of recent cultures. This specific cultural horizon appears to furnish a strong linkage of American archaeology with that of the Old World.

The discovery of the site called Iyatayet and the determination of its stratigraphy were described after the University of Alaska field trip of 1948.[1] By way of a brief recapitulation, two mounds, Nukleet and Iyatayet, were identified on high benches or terraces between rocky cliffs on opposite sides of Cape Denbigh. Nukleet is a permanently frozen site on the east side of the Cape in which three cultural stages of local Eskimo development take us back through several centuries. Iyatayet (Fig. 58) on the west side is only partly frozen, but contains in its upper levels abundant evidence of the same stages of culture as those at Nukleet. Beneath those deposits, however, lie older culture levels. The middle levels probably represent more than one phase. They contain a predominance of stone types like those of Point Hope Ipiutak and Near Ipiutak (Larsen and Rainey, 1949), also stone lamps ranging from very small round ones to triangular forms nearly a foot long; thin, hard cooking pots with both flat and conical bases which are covered on the outside with either dentate or simple stamp; and a number of flaked blades, points and scrapers that suggest Bristol Bay, south Alaska, and eastern (Dorset) cultures. Organic materials in these levels are scarce and poorly preserved.

Lying under the levels just described is a layer of laminated sandy loam of very fine texture in which appear neither stones nor cultural remains. Its thickness ranges up to 18 inches in the sections thus far excavated. Beneath this sterile layer is found the thin stratum of pebbles and flints that we may distinguish as the *Denbigh Flint Complex*. This

[1] Giddings (1949). The work in both 1948 and 1949 was made possible by the Arctic Institute of North America in cooperation with the Office of Naval Research. Grateful acknowledgment is made to Mr. and Mrs. Wendell Oswalt, Walter Arron, and Simon J. Newcomb, who took part in the field work; to Mr. and Mrs. Richard Collard, Alaska Native Service teachers at Shaktoolik, for their kindness and aid; and to the Shaktoolik Eskimos who helped us find and excavate the sites. These field trips were coordinated with those conducted by Helge Larsen in the Bristol Bay region and on Seward Peninsula during the same years.

The author wishes to acknowledge the helpful and suggestive appraisals of the Denbigh Flint Complex from several American and European specialists who have kindly examined the material in New York and Philadelphia. Their opinions will be of the greatest value in a final report. In view of the preliminary, and largely descriptive, nature of the present paper, however, it would seem presumptive to quote any one of these specialists until they, as well as the author, have had an opportunity to weigh all of the evidence. Since the writing of this paper, during the winter of 1949-50, another season of excavation at Cape Denbigh has brought forth geological indications that the Denbigh Flint Complex was deposited at Iyatayet at a time when the climate was colder than that of the present time. Other than this and additional confirmatory evidence of a long time span between the earliest and later cultural deposits, however, the picture is not greatly changed.

My thanks also go to Mr. Reuben Goldberg, University Museum, University of Pennsylvania, for his skillful work in photographing the artifacts illustrated in this article.

oldest cultural horizon contains practically no organic matter, and is supported on a thin layer of whitish silt loam[2] that coats the underlying yellow, disintegrated bedrock.

The stratigraphy is thus clearly defined, and the bottom material isolated, in various parts of the site where later housebuilding and disturbance has not affected the ground.

In contrast to the few square feet of the flint complex exposed in 1948 (Giddings, 1949, p. 86), we have now some 400 square feet of excavation and more than 800 artifacts from the undisturbed level in various parts of the site. Only the material found in place under the laminated sandy loam will be considered here.

THE DENBIGH FLINT COMPLEX

An assay of the types that make up this collection is not tremendous. All but 5 objects are of flinty materials—gray and black chert, obsidian, and chalcedony, in the order of their abundance. All artifacts are small enough to be stored in 4x5x8 cm. rectangular pillboxes. The categories into which these artifacts may be arranged for a rapid analysis are the following: 1) forms previously reported only from the Old World, where they were characteristic of Upper Paleolithic and Mesolithic periods; 2) forms like those from certain Folsom and "Yuma" sites of North America; 3) prepared cores and lamellar flakes and retouched derivatives of such flakes; and, 4) objects either unique at this site or of a generalized nature that does not connote time or space limits.

The first category includes burins and the sliver-like spalls struck in preparing or resharpening these instruments. The major burin types of the Aurignacian are represented—types which in modified forms and sporadic distribution continued to be made throughout Mesolithic times. These include, among others, both transverse and oblique angle burins[3],

[2] These soil designations are those of the U. S. Department of Agriculture, made from soil samples collected in 1949.

[3] Burin typology here referred to is the English terminology which Burkitt (1925, pp. 68-71) substituted for the French classifications of Bourlon (1911). For details of technique, see the French author.

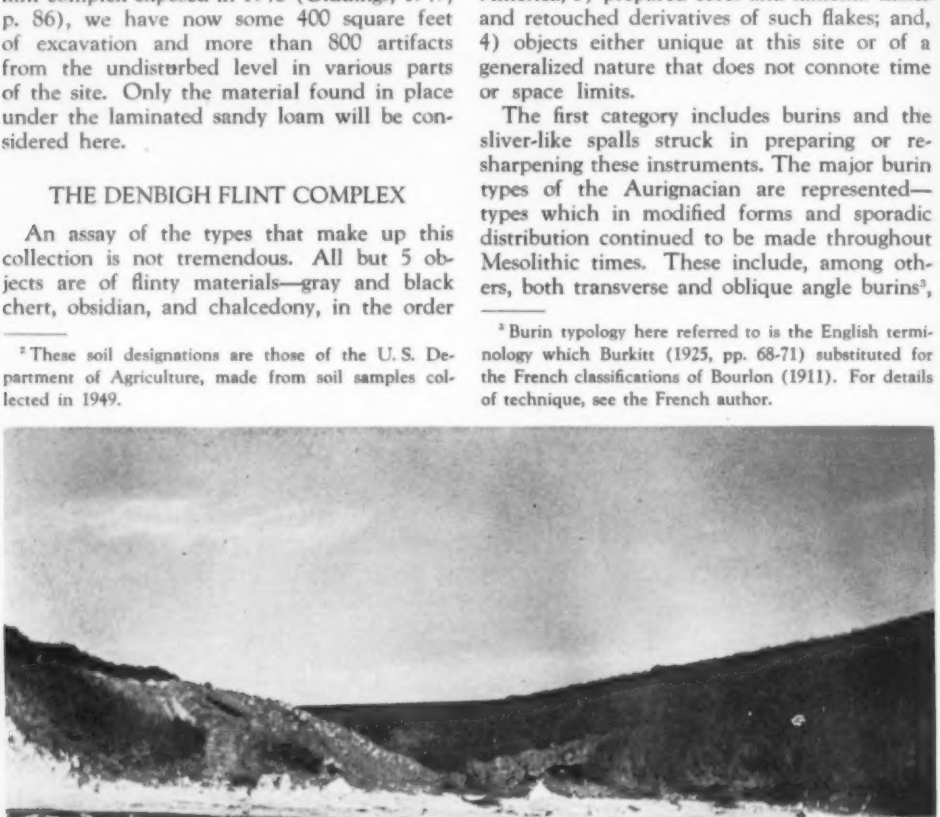

FIG. 58. Iyatayet Site. The lighter, grass-covered areas are midden. The older deposits are only on the terrace to the left.

which are single-trimmed or double-trimmed, "chisels", the elaborate beaked burin, and double burins (Fig. 59, *a*; Fig. 60, *a*). They range considerably in size. Some are as small as the micro or pigmy burins of Europe, but only two are obviously derived from lamellar flakes, as are the prototype. Ninety-three burins and about 150 spalls make up more than one quarter of the collection.

The second class of objects includes points or blades, a form of "channeled" scraper (Fig. 62, 5) and a single graver of the "Folsom" type (Fig. 59, *b*, *1*). A fluted point of chalcedony falls within Fischel's (1939) estimated range of Folsom point measures (Fig. 63, *a*). It is 42 mm. long, 23 mm. wide where the sides are parallel, and 5 mm. in thickness. The fluting extends about two-thirds the distance from base to tip on each face, and the intact ear-like projection is pronounced, and continuous with one edge. The other projection is broken off. Instead of the strongly oblanceolate outline of some Folsom points, however, this specimen tapers toward the tip as does a similar point—the only other from Alaska—described by R. M. Thompson (1948).

A parallel-flaked, straight-edged, broken point or blade of chert represents the type that has been known as Oblique Yuma (Fig. 60, *b*, 3). This carefully executed, thin object is possibly the first of its kind to be found in direct association with a complex of other flint types in undisturbed stratigraphy (Wormington, 1949, pp. 62-66). A point of black chert with slight basal insets (Fig. 60, *b*, *1*) calls to mind the Eden category, and still another, cruder, basally-thinned, point (Fig. 60, *b*, *2*) resembling "Plainview" forms (Krieger, 1947, p. 952), shows the "basal grinding" of the edges that is often noted on early American points (Wormington, 1949, p. 30). Several other large points are in the form of fragments too small for positive classification. One of these fragments has been basally ground.

In the third class fall two prepared cores (Fig. 61, *b*, *1*) and 190 lamellar flakes and fragments (Fig. 61, *b*), and a large number of diagonally-retouched small thin side blades and end blades (Fig. 61, *a*), many of which show that they were fashioned from lamellar flakes, and all of which fall within a range of size that would allow them to have been so derived. The delicacy of the diagonal spalling that has shaped some of these microblades is exceptional. The more perfect examples may be even more delicately executed than the remarkable diagonally-flaked pieces that we know from certain Egyptian and north European neolithic sites (Perony, 1934, pp. 34-35). One specimen (Fig. 61, *a*, *10*, and Fig. 63, *b*) only 34 mm. long has more than 20 ribbon-like scars reaching from edge to edge on both faces. Two types of long side blades—one crescentic in outline (Fig. 61, *a*, 8) and the other triangular (Fig. 61, *a*, *9*, *10*)—and doubly-tapered blades (Fig. 61, *a*, *1-7*), such as may have tipped arrows, make up the majority of end results of lamellar flaking; but some of the raw flakes, especially those of obsidian, have been either retouched only about the edges (Fig. 61, *b*, *3-7*) or used as blades or points without further working.

Into the fourth, and last, category fall various scrapers, including a variety of well-made end scrapers (Fig. 62, *1-4*, *6-11*), flake-knives or scrapers retouched only on the convex face (Fig. 59, *b*, 6-8), keeled scrapers or gravers (Fig. 59, *b*, 5, 9) similar to certain Aurignacian forms intermediate between large keeled *grattoirs* and burins (Sollas, 1924, Fig. 171, 3); small, double-pointed objects with a lateral projection at center; and a few other flints not presently classifiable. Short, wide, and thin blades with concave bases (Fig. 64) so closely resemble specimens found hafted as sealing harpoon blades at Ipiutak (Larsen and Rainey, 1949) as to leave little doubt about their function. These were found in a variety of sizes.

Only two pieces of worked stone are of other than flinty material. One of these is an irregular piece of red shale rubbed flat on six surfaces as though in producing paint, and a shaft smoother of sandstone. The shaft smoother is deeply grooved longitudinally to receive a small shaft, presumably that of an arrow. Other grinding of stone is confined to nine small trimmed pieces of chert, both sides of one edge of which are ground thin, perhaps for use as some sort of creaser, or groover (Fig. 59, *b*, 4). Three bits of small animal bone, a fragment of charcoal, and a bit of birch bark make up the total of organic objects recovered from the level. The birch bark is distinctive, however, in that one edge is cut straight just past a line of widely spaced pairs of small holes. This appears to have been part of a lashed or sewn vessel.

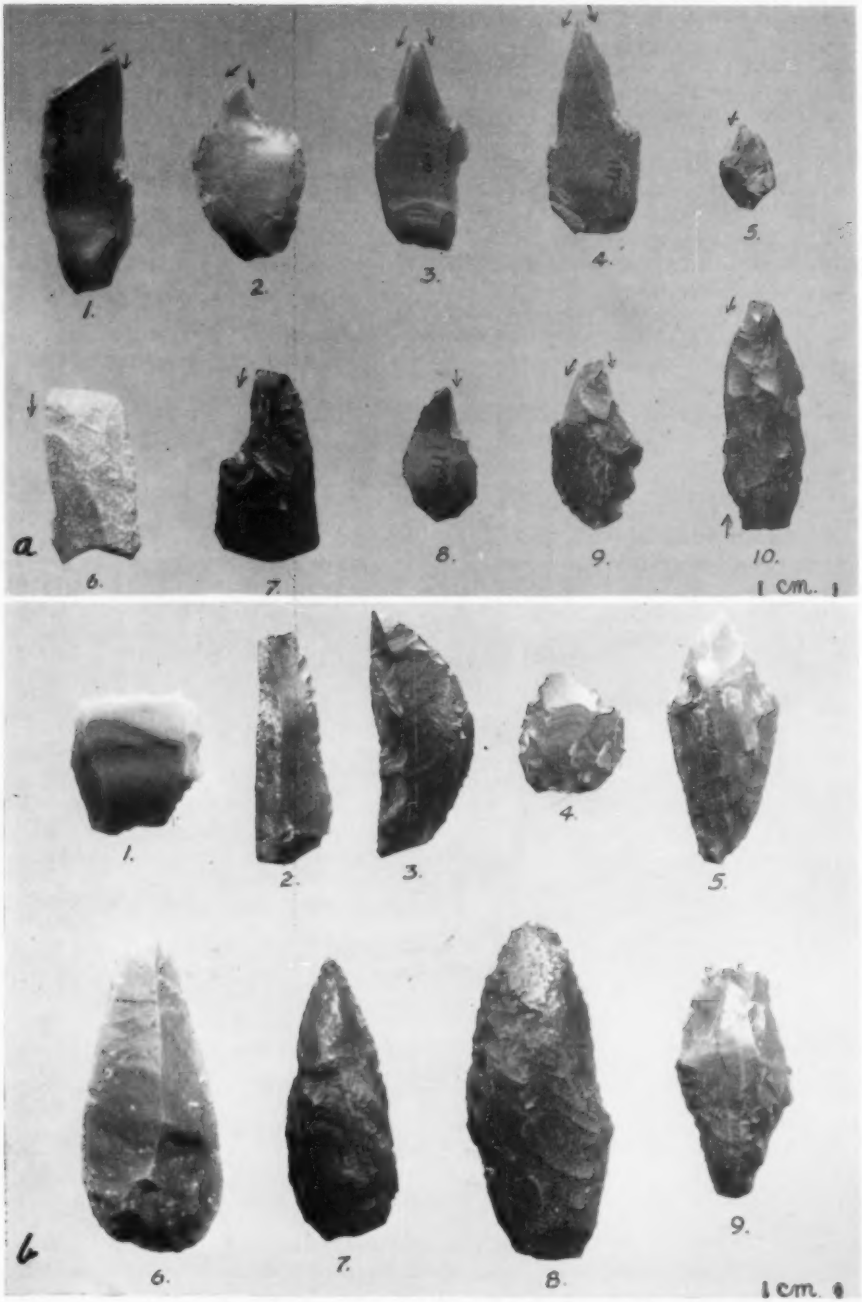

FIG. 59. *a*. Burins. *1*, Angle burin, both edges resulting from burin blows; *2*, beaked burin, one of three facets showing at upper edge (reverse of Fig. 60, *a*, 9); *3*, chisel burin (reverse of Fig. 60, *a*, 8); *4*, chisel burin; *5*, angle burin, one edge trimmed; *6*, corner burin, one edge trimmed; *7*, angle burin, one edge trimmed; *8*, angle burin, one edge trimmed; *9*, two-sided burin, enclosed edge trimmed; *10*, double burin, one edge trimmed. *b*, Flake knives, keeled scrapers. *1*, "Folsom" type graver; *2* and *3*, gravette-like blades; *4*, "creaser" of chert with ground edge; *5*, keeled scraper; 6-8, flake knives; 9, keeled scraper.

INTERRELATIONS

The occurrence of these various types and techniques in the same stratigraphic level, under conditions that strongly suggest a single facet of culture, leads us to a closer appraisal of the data. What of the time involved? What new perspective does this situation give to American prehistory?

The purely stratigraphic evidence lends assurance that the bottom level must be older than previously defined coastal cultures of Alaska. Above the laminated loam are to be found side blades, end blades, discoidal scrapers, ground adz blades, flaked blades ground at the center of each face, large labrets, and other types like those known from Ipiutak, plus a few bone and ivory pieces all of which fit into the Ipiutak or Near Ipiutak patterns (Larsen and Rainey, 1949). Since Ipiutak and the earliest St. Lawrence Island cultures (Collins, 1937; Rainey, 1941) represent the first we know of a more or less continuous series of Alaskan coastal developments, we may consider their dating, when it is fully determined, to serve as an upper limit in the range of time speculation for the Denbigh Flint Complex.

The barren sandy loam that overlies the old layer offers little direct evidence as to the time required for its deposition. In trowelling through this medium one strikes no coarse material, but finds laminations set off by darker and lighter coloration. These layers seem to represent a series of once exposed surfaces upon which some form of plant life grew. No identifiable stems or roots remain to identify such vegetation as that of the present ground surface, however; nor does there seem to be a differential in the size of soil particles to indicate seasonal deposition in the nature of varves.

The layer of pebbles and flints in the Denbigh Flint Complex is everywhere thin and plastered to the top of a dense, whitish silt loam. This is identified by Eskimos as the sort of "clay" formerly collected near or on this site for the making of pottery. People would scarcely have chosen this soil upon which to walk and camp. It is very slippery and sticky when wet, and it hardens to cement-like consistency when dry. Pits for houses are not likely to have been dug through this soil into the crumbly, yellow bedrock material underneath. It is noteworthy that no evidence of digging or construction was found in connection with this layer. The pebbly layer often appears blackened because of minute flecks of charcoal, but in only one case did we find an area that might have been a fireplace. In this particular spot, near the upper edge of the bench on which the site is located, an oval area about six feet long contained near its center a space more blackened than elsewhere, and a concentration of pebbles. With this possible exception, the old layer could have been subjected to surface washing prior to its being covered by the sandy clay.

The most plausible explanation of this deposit is that the campers who left their flints here were protected from the silt loam by grass or other vegetation that has since completely disintegrated and leached into the ground.[4] If these people had permanent houses in the area, the houses must have been at some distance from the terrace at Iyatayet. No evidence remains that floors were levelled off for the erection of tents or other shelters on the site; nor do there seem to be concentrations of flints and chips such as one would expect to find in an old floor.

Another significant detail is that neither the pebbly layer nor its confining soils lap over the edge of the terrace. Tests to bedrock on the slope of the site and in the local stream bottom yielded only the detritus of the later cultures, with about the same proportion of probable early flints that one finds in all of the later deposit on top of the bench. This indicates that some factors had removed all of the earlier deposits from the slopes to a height of at least thirty feet above present sea level before the arrival of Ipiutak-related cultures. Similar tests on the slope at the rear of the bench fail to show the old stratification more than sixty feet above present sea level. If this points to a deposition by water of both the whitish silt loam and the pebbles associated with the flint complex, it must have been the result of fresh water action. The absence of foraminifera in soil samples (submitted for examination to Dr. A. R. Loeblich, Jr., of the

[4] Low phosphate content of the confining soils, as determined by the Department of Agriculture analysis of soil samples, indicates little bony material present in soluble condition. This may be explained by a similarly low pH content of the soils — an acid condition that would work against preservation of organic matter.

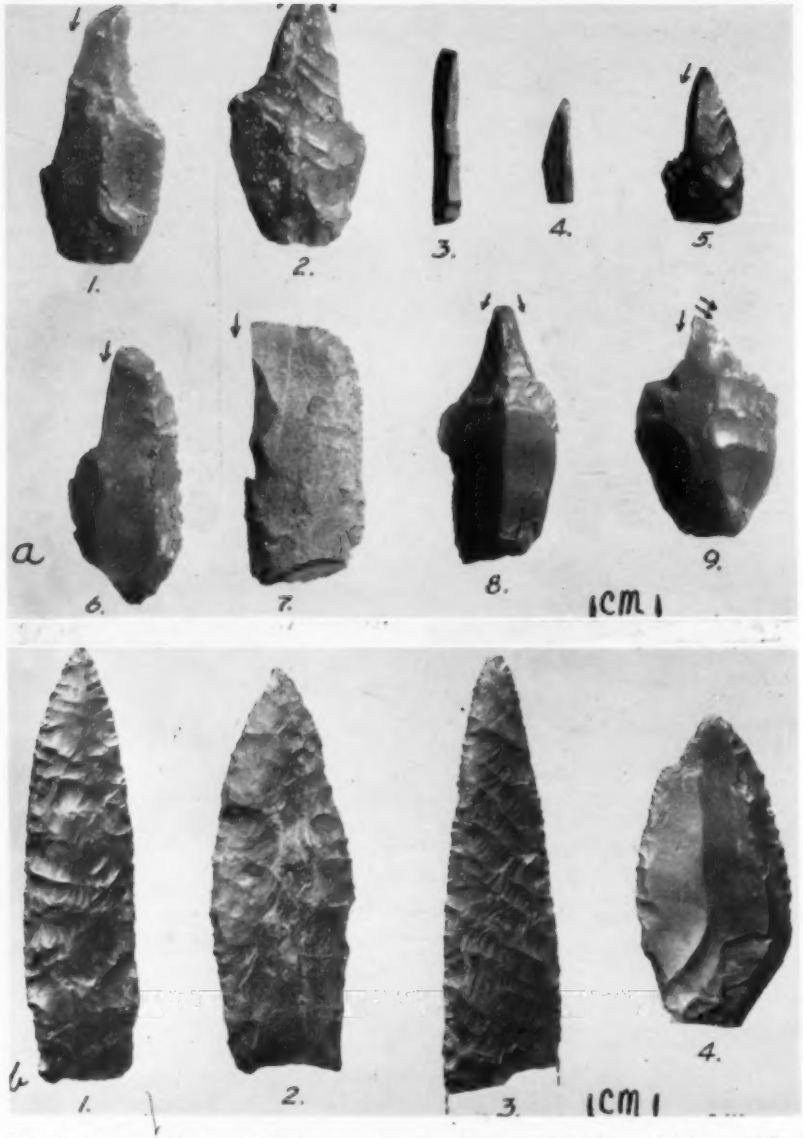

FIG. 60, *a*. Burins and spalls. *1*, angle burin, one edge trimmed; *2*, two-sided burin; *3-4*, burin spalls; *5-6*, angle burins, one edge trimmed; *7*, corner burin, one edge trimmed; *8*, chisel burin (obverse of Fig. 59, *a*, *3*); *9*, beaked burin (obverse of Fig. 59, *a*, *2*). *b*. Points or blades. *1*, basally-thinned blade with basal insets; *2*, basally-thinned, basally-ground blade; *3*, diagonally-flaked blade fragment; *4*, plano-convex blade, trimmed only on convex face.

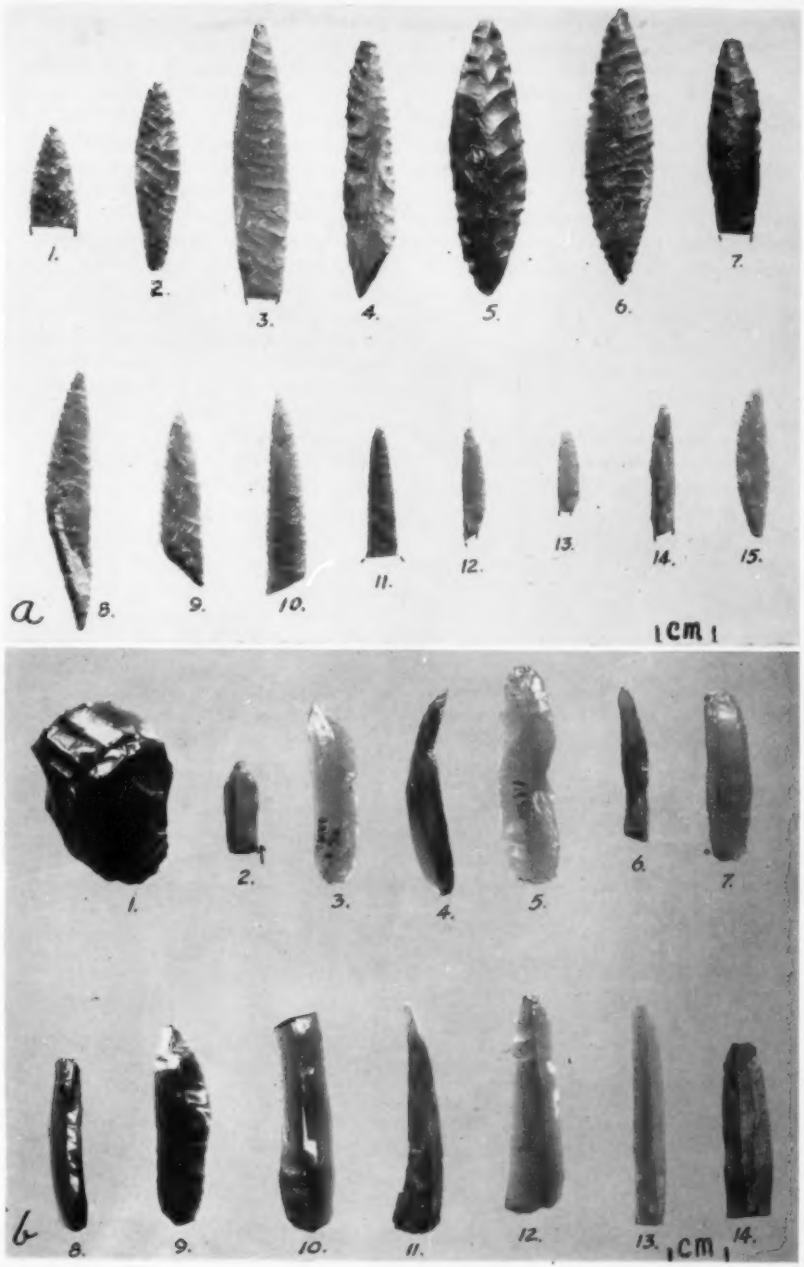

FIG. 61, *a*. End blades and side blades. *1-7*, plano-convex blades, probably end-hafted; *8*, crescentic side blade; *9-10*, triangular side blades; *11*, blade fragment — widens at broken base; *12-15*, side blades and fragments. *b*. Lamellar flakes and prepared core. *1*, prepared core — six lamellar flake scars showing on upper surface; *2*, micro-burin—burin blow indicated—opposite end trimmed on both faces, perhaps for use as drill; *3-7*, variously retouched lamellar flakes; *8-14*, lamellar flakes — some show use without retouch.

Smithsonian Institution) shows that the silts are not derived from a sea deposit.

Further speculations on the age of the old layer have to do with cross-comparisons of the flint types in the deposit. First of all, we wonder how closely this complex resembles Ipiutak culture, the most distinctive in flint work, and one of the oldest cultures, previously defined for the Bering Strait region. Larsen and Rainey (1949, pp. 92-93) point out the absence of lamellar flaking at Ipiutak:

> It should be noted that not a single fluted core, and hardly any regular, oblong, thin flakes, were found at Ipiutak. The cores are bilateral or irregular . . . and the unused flakes or spalls are usually angular rather than oblong.

Neither burins nor the early American types of Cape Denbigh are reported for the Point Hope site. Those Denbigh forms that do occur at Ipiutak without appreciable difference in technique are the probable harpoon blades and a form of flake knife, or scraper. At first glance, the Denbigh inset blades seem to be like those of Ipiutak, but although some of the flaking at Ipiutak was diagonal, this was neither a predominant trait nor as refined a technique as that of Denbigh. And these small blades are apparently made of lamellar flakes at Denbigh, but not at Ipiutak.

It looks as though Ipiutak has inherited these particular resemblances from an earlier horizon represented by the Cape Denbigh finds. We would be hard pressed to explain the absence of the more distinctive flaking techniques of the latter except on a temporal basis. It is to be noted, however, that lamellar flaking has persisted until fairly recent times at certain inland and eastern localities (de Laguna, 1947, pp. 171-2; Giddings, 1944, p. 121).

Fig. 62. Scrapers, etc. *1-4*, end scrapers; 5, channeled scraper; *6-11*, end scrapers; *12-16*, thin blades or scrapers.

The occurrence of burins as one of the most important traits at Cape Denbigh takes us to the Old World for comparatives. I am not aware of the occurrence of true burins anywhere else in America, though it would be exceedingly strange if their intrusion into the New World had ended at Cape Denbigh. Burins had their "great period" in Aurignacian times. Variety dropped somewhat during the Magdalenian, and even more during the microlithic and blade developments of the Mesolithic phases. Burins do not characterize the Neolithic of Europe. It is tempting to offer the extensive lamellar flaking and burin-making at Cape Denbigh as a Mesolithic combination. The difficulty here is that although the Cape Denbigh flakes were reworked into a variety of forms, these do not include the small trapezoids, crescents and other geometric figures so generic to the microlithic cultures.

The intermediate stages between the Paleolithic and the Neolithic of northeastern Asia, on the other hand, appear to lack the small geometric forms of the Mesolithic as defined for more westerly regions. If the burins and American types were to be removed from the Denbigh Flint Complex, the remaining flints would make up a complex remarkably like that reported by Nelson as the third of six stages ("Mesolithic") present in the Gobi Desert. These include: "cores, or nuclei"; "flakes, long, slender, prismatic, and often very delicate, with little or no retouch or sign of use"; "perforators produced by trimming or secondary chipping of flakes"; "retouched flakes, various forms, of uncertain purpose but of use as knives or scrapers"; and numerous "end-scrapers, small, mostly thumbnail size, round to oblong, some double-pointed" (Berkey and Nelson, 1926, p. 12). Denbigh diagonal retouching of lamellar flakes is not mentioned for the Gobi finds, however; nor are the hammer stones of the Gobi present at Denbigh.

Reports of burins are exceedingly rare in all of northeastern Asia, and it appears certain that no great number or variety of burins occurs in any of the known sites.

It is far from my intention to imply cross-dating with any of the Old World phases of prehistory, but with regards to inheritance of techniques it should be pointed out that in addition to most of the early burin forms, the Iyatayet collection includes a strangulated blade, two characteristic snail-like, intermediate keeled scrapers (Fig. 59, *b*, 5, 9), leaf-shaped points retouched only about the margin of the convex face (Fig. 60, *b*, 4), and a few less distinctive pieces, all of which resemble Aurignacian work. Perhaps when more is known of northeastern Asiatic prehistory we shall better understand why certain of these early techniques were retained at Denbigh

FIG. 63, *a*. Fluted point. Approx. actual size. *b*. Side blade, reverse of Fig. 61, *a*, *10*, enlarged. Approx. 3.3 cm. in length.

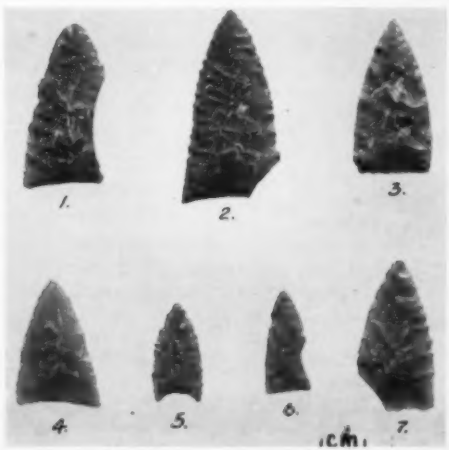

FIG. 64. Harpoon (?) blades.

while others had been either selected out or were beyond the boundaries of common ancestry.

Recent finds at Kluane Lake (Johnson, 1946, pp. 183-186), near Point Barrow (Solecki, 1950, pp. 3-7), and elsewhere in the interior of Alaska (Rainey, 1939; Skarland and Giddings, 1948) and the Yukon Territory indicate the wide spread of a blade and lamellar flake industry often under geological conditions that suggest great age. It appears likely that we shall soon have tangible support for hitherto hypothetical waves of Old World methods that spread to form the bases of specialized American developments. Permanently frozen deposits in Alaska should soon begin to give us a fuller picture of the cultures that enabled man to establish himself on both sides of Bering Strait before the elaboration of specialized Eskimo culture. Such a frozen site is suggested by the Seward Peninsula caves in which Helge Larsen, in 1949, found objects of antler and other organic material together with lamellar flaking well below Ipiutak levels.

Perhaps the greatest significance of the Cape Denbigh finds is that they point to more sophistication of culture on the part of early Americans than has hitherto been widely acknowledged. Regardless of how early or how recent the first campers at Iyatayet may prove to be, they show us that it was possible to combine lamellar flaking, burin making, and Folsom and Yuma techniques with other specialties that presumably go with the taking of animals from the sea. We have no need to look for harpoon blades on the Great Plains. But it is comforting to believe that the ancestors of the American Indian could have made the transition from Asia to America without suffering hardship in the proximity of the tremendous food resources of Arctic waters.

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AN ARCHAEOLOGICAL SURVEY IN THE STRAIT OF BELLE ISLE AREA

ELMER HARP, JR.*

THIS paper is a preliminary descriptive report of an archaeological reconnaissance undertaken during the summer of 1949 in southern Labrador and northern Newfoundland. The project will be continued in the summer of 1950, but since the prehistory of the area is both interesting and relatively unknown, I have thought it worth-while to write a brief account of the work as far as it has progressed.

The general purposes of the investigation are to delineate the culture of the Beothuck, or Red Indians, who once inhabited Newfoundland, and to trace their derivation; to clarify the manifestations of Cape Dorset Eskimo culture first noted in Newfoundland by Jenness (1929) and Wintemberg (1939, 1940); and to check on the possibilities of contact between the Beothuck and Dorset Eskimo with a view to tracking the diffusion of certain traits which, it is believed, occurred during the Archaic period.

These cultures, now both extinct, are largely unknown. Each of them has undoubted affinities with early culture strata in the northeast, yet the basic problems of their origins and relationships remain unsolved. Our scanty information concerning the Beothuck indicates a possible tie with the early Algonkian peoples of the northeast, and Speck (1922, p. 15) has suggested that they may have been the last isolated outpost of a paleo-Algonkian stratum. Their material culture, as it has been reported, suggests the Laurentian aspect and, thus, some linkage with the other archaic cultures of northern New England and the maritime provinces. The issue of their specific derivation is clouded to a degree by the linguistic evidence; some 500 Beothuck words have been preserved, and on the basis of these Voegelin (1946, p. 193) assumes that their language was not Algonkian in its affinities.

The problem of Cape Dorset Eskimo culture in Newfoundland is likewise an intriguing one. The initial discoveries, made by Jenness and Wintemberg in 1927 and 1929, were not complete enough for any total reconstruction, and Wintemberg (1940, p. 330) claimed for their material only that it may have been related to the true Dorset. This culture itself is still largely a puzzle. Although it may possibly have relationships with Old Bering Sea I, Kachemak Bay I, and the north Pacific area in general, as yet there are no real clues to Dorset

* I am grateful to many for help in this venture. The project was supported by a grant-in-aid from the Arctic Institute of North America with funds supplied by the United States Government, and the same institution is also underwriting the 1950 field work. In the field I was assisted by Stearns A. Morse, Dartmouth '52, and we two were furnished transportation to and from the area by the arctic research schooner *Blue Dolphin*. Particular thanks are due Commander David C. Nutt, Master of the *Blue Dolphin*, for his cooperation in this matter, and for the actual support of his vessel while she worked in the Strait of Belle Isle. I am also very much indebted to many friends on the coast for their help and hospitality, especially Dr. Charles Curtis, Superintendent of the Grenfell Mission at St. Anthony, to various members of his staff there and in outlying stations, to Father Alphonse Tessier, O. M. I., of West St. Modeste, Labrador, and to Dr. and Mrs. Noel Murphy of Norris Point, Bonne Bay.

origins (de Laguna, 1946, p. 107). The physical type of its people is unknown, the content of its key sites varies strikingly, and its chronology is uncertain. There has even been serious doubt as to the Eskimo origin of Dorset because of its many Indian-like characteristics, although Collins (1940, p. 571) believes that it may well have been an Eskimo culture in spite of these anomalies.

Further major unsolved problems in the prehistory of the northeast concern the possibility of contact between Indian and Eskimo, and there is a wide divergence of opinion on this matter. Strong (1930, p. 142) has postulated an early stone culture in the northeast which he believed contained nearly all the potentialities for both Eskimo and northern Indian cultural development, but de Laguna (1947, p. 17) holds for separate origins and believes that certain traits (such as detachable barbed points, ground slate, ulu, etc.) passed from the southern Dorset to the Indians and thus led to the emergence of the inland and coastal Laurentian aspect ca. 1000 A.D. Gjessing (1948, p. 299) on the other hand is of the opinion that many of these so-called Eskimo traits are not typical Eskimo inventions at all, but rather stem from the generalized circumpolar complex which, he believes, supplied many Old World components to early northeastern Indian cultures prior to the first Eskimo migrations to the New World.

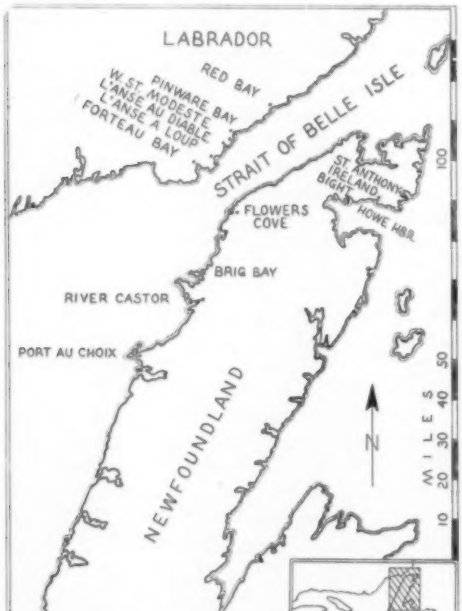

FIG. 65. Area covered in the survey of 1949.

It seems apparent, therefore, that our entire understanding of the earliest human occupations of arctic and sub-arctic North America hinges to an appreciable degree on our knowledge of culture sequence and interrelations in the northeastern portion of the continent. It seems possible, furthermore, that the archaeology of Newfoundland may yield answers to some of our questions.

The reconnaissance of 1949 was carried out on both the Labrador and Newfoundland coasts of the Strait of Belle Isle. The choice of this area was based on the assumption that these shores, which at present are separated at the narrowest part of the Strait by a nine-mile stretch of water, would have afforded the easiest bridgeheads for an early movement of people to the island. Similarly, if certain tales are true concerning the escape of a handful of Beothuck back to the mainland (Howley, 1915, p. 277) this area may also contain a clue to their final disappearance as a tribal entity.

Figure 65 indicates the sites that were located and checked during the 1949 season. The last week in June and the first three days in July after arriving in the area were spent operating on the Labrador coast, with the *Blue Dolphin* as a mobile base. During this time three sites were investigated in Forteau Bay and two others in the neighboring cove, L'Anse a Loup. Additional surveys northward along the coast in Red Bay, Carrolls Cove, and Black Bay, were unsuccessful. On July 5th we sailed to St. Anthony, Newfoundland, and there on July 7th Morse and I parted company with the *Blue Dolphin*. The remaining summer travelling was done in small motor boats hired from the local fishermen.

From St. Anthony, a six day trip was taken south into Hare Bay, but the results were meager. It was then decided, on the basis of experience gained in Labrador, to return to the mainland and work the Pinware Bay section of that coast, and ten days spent there were extremely profitable. Twelve sites were discovered in L'Anse au Diable, West St. Modeste,

and in Pinware Bay itself. Thence we moved across the Strait and set up camp in Flowers Cove, Newfoundland. Operations in that section, however, between Savage Cove on the north and Ste. Barbe Bay on the south, were a complete failure. We moved southward from Flowers Cove and established camps at Brig Bay and River Castor, but neither of these centers was productive. The next shift to Port au Choix was more encouraging. Here the four sites mentioned by Wintemberg (1939, pp. 85-86) were hunted down and investigated, and, in addition to these, three other new sites were discovered on Cape Rich peninsula.

On August 27th we arrived in Bonne Bay and set up the last camp of the summer on Norris Point. The well-known site on this point was looked over, and further reconnaissance in the area brought to light another site on Wild Cove Head. Investigation was just beginning on the southern shore of Bonne Bay when unexpectedly the *Blue Dolphin* returned on August 31st, and operations had to be suspended at once in order that we might proceed overland to Corner Brook the next day to rendezvous with the ship for the return voyage home.

In brief recapitulation, 838 specimens were obtained from seventeen sites in southern Labrador and twelve sites in northern and western Newfoundland. Specimens were collected both from the surface and from small test excavations, whenever significant features such as hearths, house pits, etc., were observed. Wherever there appeared to be a significant relationship between a given site and one of the old raised beach lines which characterize these coasts, a leveling traverse was run with an Abney level down to the high tide mark.

LOCATIONS OF SITES INVESTIGATED IN SOUTHERN LABRADOR

Forteau Bay-1—On the south side of Buckles Point, Forteau Bay. Note: the three sites in Forteau Bay are located with reference to U. S. Hydrographic Office Chart No. 2684, 3rd Ed., Dec., 1943.

Forteau Bay-2—On Crow Head, north shore of Forteau Bay.

Forteau Bay-3—Between the two brooks at the head of L'Anse aux Morts, east end of Forteau Bay.

L'Anse a Loup-1—In the sand barrens directly behind the houses in the settlement. See H. O. Chart No. 2064, 2nd Ed., Oct., 1922.

L'Anse a Loup-2—On the south side of the brook, about one-quarter mile west of the above settlement, and at an elevation of 100 feet above sea level. See H. O. Chart 2064, 2nd Ed., Oct., 1922.

L'Anse au Diable-1—Directly behind the settlement, in the sand barrens on both sides of the brook. First mentioned by Lloyd (1874, p. 41). See Diable Bay, H. O. Chart 0924, 24th Ed., May, 1947.

L'Anse au Diable-2—On the point of land one-quarter mile east of the brook in L'Anse au Diable. See H. O. Chart 0924, 24th Ed., May, 1947.

West St. Modeste-1—Approximately one-half mile north of the settlement of West St. Modeste, directly on the summer trail to Pinware settlement. See H. O. Chart No. 2064, 2nd Ed., Oct., 1922, for this and the following sites.

West St. Modeste-2—About 200 yards south of the last house in the settlement of West St. Modeste, on the trail to Capstan Island; 40 feet above sea level.

West St. Modeste-3—Approximately 200 yards inland in a westerly direction from West St. Modeste-1.

Pinware West-1—In the sand barrens behind the Catholic church in the westerly settlement of Pinware Bay at Ship Head.

Pinware West-2—On the north face of the granite-topped hill which stands about one-half mile NNW of the westerly Pinware settlement; 140 feet above sea level.

Pinware West-3—On the south face of the same hill as Pinware West-2; in blowouts on the bench 100 feet above sea level.

Pinware West-4—On the south side of the southernmost brook in Ship Head Cove; 20 feet above sea level.

Pinware West-5—On the south side of the northernmost brook in Ship Head Cove; about one-quarter-mile upstream from the mouth of the brook near the point where the foot path crosses; 20 feet above sea level.

Pinware East-1—In the sand barrens about 200 yards behind the houses of the settlement on the east bank of Pinware River.

Pinware East-2—In the same barrens as the above site, but located about one-half mile farther east near the base of the rocky hills which border the valley.

The coast of Labrador along the southwestern portion of the Strait of Belle Isle is barren and steep. The land in most places rises quite sheer from the sea and attains a height of five hundred or more feet before it commences to level off. Bays and coves are generally the only places which provide suitable occupation sites, and these have been used by both the prehistoric and modern inhabitants. A typical cove offers some degree of shelter from the severe winds which channel up and down the Strait, and it is also usually marked

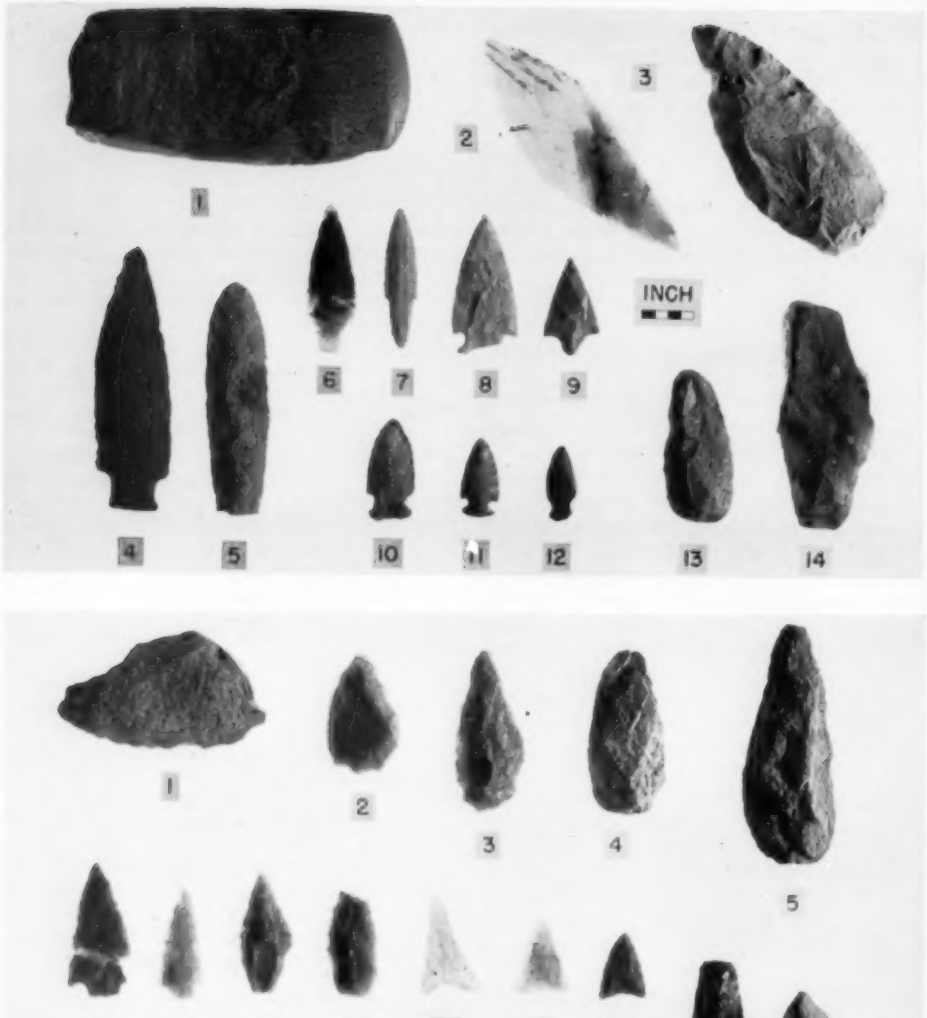

FIG. 66, *a.* (above) Material from Labrador occupation sites. *b.* (below) Material from Labrador workshops and campsites.

by the mouth of a running stream. In days gone by the protected slopes of these bays, as well as the valleys which pass from them toward the interior, were undoubtedly heavily forested with spruce and fir, but that pristine condition no longer exists except in those places where there are no modern fishing settlements. Wherever these settlements are found the land has been completely deforested, and in a settlement like Forteau Bay the people must now trek as much as fifteen miles into the back country in order to obtain sufficient firewood.

MAJOR OCCUPATION SITES

The major prehistoric occupation sites thus far discovered are generally situated in the head ends of these embayments, near the mouths of streams, on more or less level benches that have been created during the post-glacial upwarping of the land. Examples of this sort are the sites which I have designated as Forteau Bay-1 and 3; L'Anse a Loup-1; L'Anse au Diable-1 and 2; Pinware West-1, 4, and 5; and Pinware East-1 and 2. All of these sites exist in sand barrens which have been denuded of whatever tree-type vegetation they may once have borne. They are areas marked by poorly stabilized dunes and scarred by deep systems of blowouts. It is difficult to establish a normal soil profile in some of these locations because their surfaces have been worked extensively by the wind. The present ground surface, however, consists of a layer of peat and turf which varies from one to ten inches in thickness. This layer undulates considerably, and it may be buried in places by as much as two feet of dune sand, which, in turn, is topped off by a thin growth of moss and lichen. It appears, then, that this turf layer is both young and relatively old; it may coincide with the present ground surface, or it may be buried by more or less recent duning. At any rate, it represents the first major stabilization of the land by vegetation, and, in the case of these major occupation sites, it is the only culture-bearing horizon. Beneath it, to a variable depth, is coarse red sand which is streaked occasionally with faint and thin buried turf horizons; these suggest older and very fleeting stabilizations of former surfaces. Below this zone there are increasing indications of water deposition, culminating in beach gravel and boulders which mark an old strand line.

Sites in this group all stand on terraces which are now twenty and forty feet above sea level. They have the appearance of significant occupations, possibly of long duration, and they spread over areas that may reach an extent of three or four acres. The material obtained from them is characterized by a high degree of uniformity.

The projectile points, of which there are several forms, all indicate competent workmanship. The majority of them have been bilaterally flaked with an additional shallow retouch around the edges. There are numerous small, leaf-shaped points which are generally made of flint or chert, although some specimens of this form from Forteau Bay-3 are somewhat cruder and verge into the class of blades because of their greater thickness; these latter, however, have all had their bases chipped thin. A single specimen of a large leaf-shaped point came from Forteau Bay-1. It is a graceful and symmetrical artifact with a squared-off base and is made of a gray, fine-grained quartzite (Fig. 66, *a*, 5). The small leaf-shaped, stemmed points (Fig. 66, *a*, 6, 7) are somewhat more variable in their shape, largely due to the stems, which may be tapering or straight-sided, and they are made both of chert and translucent gray quartzite. Four larger specimens of this same form were also found; one of these, from Forteau Bay-1 (Fig. 66, *a*, 4), is made of brown felsite and has coarse body flaking plus a careful bilateral retouch of the edges.

A total of only eight corner-notched points came from this group of sites, and all are triangluoid forms made of chert and quartz (Fig. 66, *a*, 8, 9). The white quartz examples, of which six came from L'Anse au Diable-2, closely resemble those found in the workshop sites at higher elevations. Three small side-notched points found at L'Anse au Diable-2 and Pinware West-5 are beautifully made of chert (Fig. 66, *a*, *10*, *11*); they are perfectly symmetrical, bilaterally pressure-flaked, and the notches in each case are deep and well-formed.

L'Anse au Diable-1 produced two unique finds; one of these is a triangular point of pink quartzite which is very similar to those from the workshop sites, and the other specimen is the only drill point found during the

summer. This chert tool is only a tip fragment with a lozenge cross-section, and in this regard it is interesting to note that the only artifacts from my collection which have any holes in them all come from Newfoundland sites, and none of these holes was made with a drill. No other drills, or signs of their use, were located in the Labrador sites.

Although numerous fragments of chipped stone blades came from these occupation sites, whole specimens were very few in number. They are mostly leaf-shaped implements which appear to have been made in two stages; first a roughing out by percussion, and finally a more refined shaping by means of pressure retouch on both faces. One double-pointed knife from L'Anse a Loup-1 is a long semi-lunar form made of translucent gray quartzite (Fig. 66, *a*, *2*). This has been fashioned from a thin flake, both surfaces of which have been further worked to a slight extent, and it has a shallow bilateral retouch around the edges. Other specimens, exactly like this particular one, were later found at Port au Choix-3 in Newfoundland. I also have one other implement which reputedly comes from this group of sites and which bears a close likeness to some of the Port au Choix-3 finds. This is a large ovoid chopping tool of translucent gray quartzite which was given to me by Mrs. Luke O'Dell of Salmon Point, Pinware Bay. It was picked up many years ago by Mrs. O'Dell's father in the sand blowouts back of the easterly Pinware settlement, which would probably place it in or near the site which I have designated Pinware East-2. The specimen is six inches long and four inches wide, with a maximum thickness of one and one-half inches. It has been fashioned entirely by rough percussion flaking on both faces, although portions of the edges have either been retouched or slightly chipped through use.

In all of the Labrador sites a total of five lamellar flakes was collected, and four of these came from the group of sites now being considered. This type of flake is extremely common in the Newfoundland sites which have been linked with the Dorset Eskimo, and many of the finds there show a purposeful retouch for use as blades or knives. The few specimens from Labrador are considerably different in appearance in that they are thicker and are not of uniform shape or size. Only two of them appear to have been retouched. On the basis of their rareness and haphazard form I tend to consider these artifacts as more or less accidental.

The majority of scrapers from the major occupation sites are made of flint or chert, although a few quartz and quartzite specimens were found. Most of them may be classed as side scrapers and have been fashioned by retouching scrap flakes. Several, however, are carefully shaped tools, particularly one snub-nosed scraper from Forteau Bay-3 (Fig. 66, *a*, *13*). Five other examples of this group are square-ended transverse scrapers that have been flaked down in such a way that they may also have been used as narrow-bladed chopping tools (Fig. 66, *a*, *14*). Among the miscellaneous forms of chipped stone tools there are four specimens which I have classed as picks or gravers. These came from Forteau Bay-3, and basically they are flakes of chert or flint which have had various edges retouched. In addition to this feature, however, they each have in common a single prepared point which has had one or more long lateral flakes sheared off, much in the same manner as a paleolithic burin. The only other miscellaneous form of tool from these sites is the simple quartzite pebble hammerstone, of which three specimens were found.

Ground or polished stone implements were not found in all of the lower occupation sites, but their apparent absence from some may be quite incidental, as these places have by no means been thoroughly worked over. The blades and points are characterized chiefly by faceting, which differentiates them from similar finds in the Newfoundland sites. A single small, leaf-shaped point with side notches was found at Pinware East-2 (Fig. 66, *a*, *12*), and all other specimens are considerably larger. One interesting point from Forteau Bay-3 has a strongly leaf-shaped blade and a long stem, at the base of which are two small lateral tangs. Another form of ground stone point found in two sites is a long, narrow, faceted blade with parallel edges and a short stem. The single intact edge of one of these specimens shows a series of minute serrations or notches which are evenly spaced one-sixteenth inch apart for a length of five inches. From Forteau Bay-1 came a large leaf-shaped knife of ground stone with a squared-off base. This specimen was severely frost-spalled, but it appears to have had a median ridge down each side.

Gouges and adzes were the other forms of ground stone tools found in this group of sites. The majority of these specimens are made of siltstone, and they are badly spalled and weathered. The gouges are either flat or trapezoidal in cross-section, and their grooves, which are shallow and tapering, tend to diminish to the surface at about the mid-length of the tool. The adzes vary in their cross-sections from flat oval to hump-backed. One example from Pinware East-2, made of greenstone, is so evenly turned out that it has the look of a broad ax (Fig. 66, *a*, *1*). It was shaped by rough percussion chipping and pecking, and the slightly curved cutting edge has been ground and polished back on both faces for a distance of two inches. Three other interesting specimens of siltstone, which are probably adze blanks, came from Forteau Bay-1; these all measure about eleven inches in length and taper from pointed polls to blade edges that are three inches wide. The fact that they were found closely packed together on the surface of a blowout suggests that they may have been a cache of unfinished implements.

No finds of steatite, pottery, or bone were located in any of the major occupation sites just considered, nor, for that matter, in any of the other Labrador sites. The absence of bone artifacts is somewhat strange, but since food bone debris was almost completely missing also, except for a few tiny calcined fragments in hearths, it seems likely that such material has simply disintegrated. In Forteau Bay-3 several thin, platey pieces of bone were noted in one of the blowouts, but they were so badly weathered that they fell apart on touch. The severity of erosion and weathering action in the coastal Labrador sites is further evidenced by the patination which characterizes most of the flint and chert finds. This condition is less typical in the sites at higher elevations. It does not appear to be a function so much of relative age as of some peculiar combination of erosive factors in the dune sands. In sites such as those mentioned above which occur in sand barrens, it was possible to select a graded series of chert flakes which range from a completely unpatinated condition to one wherein the original bonding agent in the stone has been lost and the specimen has become pure Tripoli.

WORKSHOP SITES

A second variety of site found in Labrador had all the characteristics of workshops. This group includes L'Anse a Loup-2, West St. Modeste-1 and 3, and Pinware West-3, all of which are situated on terraces at an elevation of 100 to 105 feet above present sea level. These terraces are marked by deposits of sand, both wind-blown and water-deposited. Their generalized profiles begin at the top with a low system of dunes and a surface layer of thin soil and duff which may be from one to four inches in thickness. Beneath this is coarse gray sand to an occasional depth of six feet, and below this, in the case of L'Anse a Loup-2, is a zone of hard-packed red sand, colored by limonite, which extends to an undetermined depth. No buried turf horizons were observed in any of these sites, and in each the culture-bearing zone was the uppermost surface turf. No signs of prolonged occupation, such as charcoal, hearths, etc., were noted, but there were myriad chips, cores, rejects, and a few artifact types, all of quartz and quartzite. Quick searches in the vicinity of each of these sites failed to disclose the source of raw material, but undoubtedly there are significant outcrops at this elevation and not too far distant from the sites.

L'Anse a Loup-2 consisted of a blown-out patch in the dunes, some fifty feet in diameter, which contained literally thousands of scrap chips and rejected artifacts of quartzitic material. Many of the smaller specimens, particularly the points, show highly competent workmanship. There are leaf-shaped points of fine-grained pink quartzite (Fig. 66, *b*, *7*, 9), and trianguloid corner-notched specimens (Fig. 66, *b*, 6), all of which have been carefully pressure-flaked on both faces. One point with a rough lozenge shape has distinct basal flutes on both sides (Fig. 66, *b*, 8); I hesitate to inject the term "Folsom-like" into this description, but it is nevertheless appropriate. Blades from this site are distinctly of a coarser nature than the points, and all are leaf-shaped. They are thick in cross-section, and have been shaped by percussion flaking only, usually on both sides (Fig. 66, *b*, *2*, 3). The scrapers are a rather miscellaneous lot of flakes that have been retouched along one or more edges, and the notable specimen in this group is a thumbnail-sized, snub-nosed scraper that has been chipped

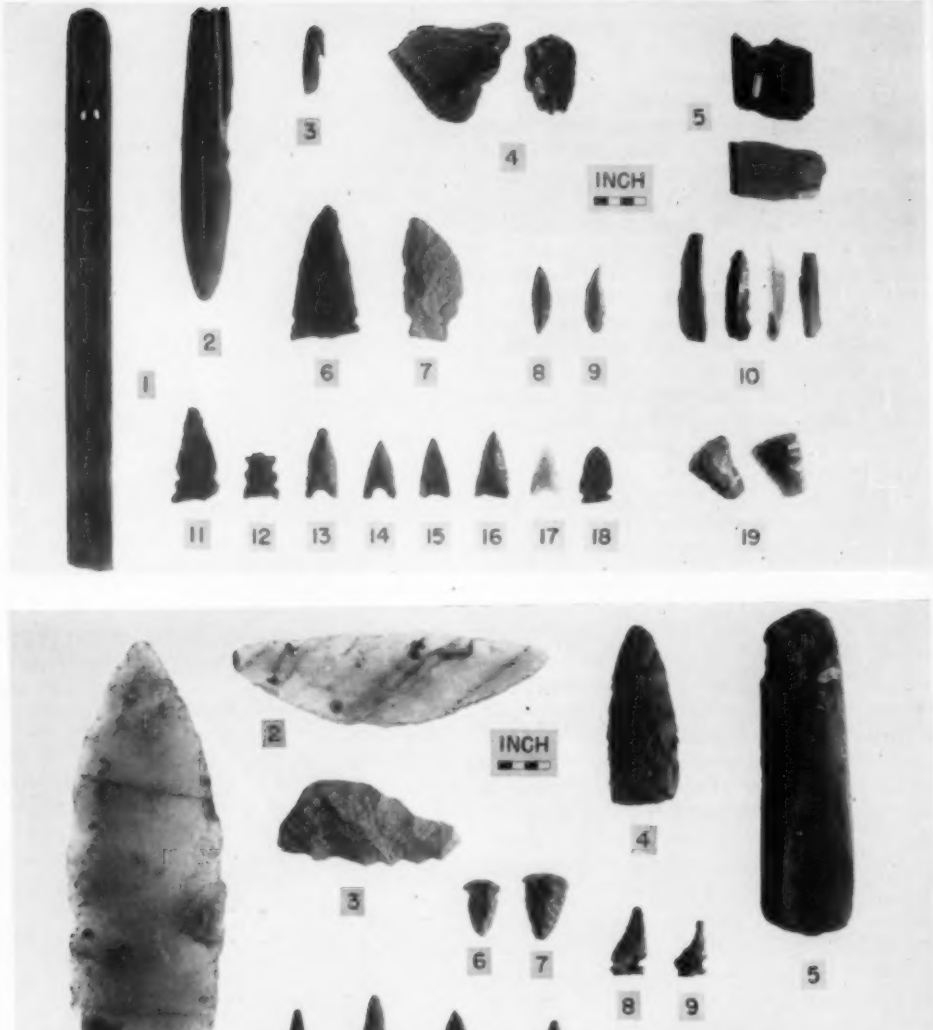

FIG. 67, *a.* (above) Material from Newfoundland Dorset sites. *b.* (below) Material from Newfoundland Aberrant sites.

on the end of a quartz flake which still shows a part of the original crystal structure. Other specimens from this site are hammerstones, all fragments of pink quartzite pebbles.

West St. Modeste-1 contained material that was about 95 per cent white quartz, plus a smattering of pink and brown quartzite, one specimen of chert, and one of a fine-grained igneous rock. The chief find here was a series of triangular points; these show slight variations in their sides which may be straight, concave, or convex (Fig. 66, *b*, *10-12*). All of this lot have been carefully pressure-flaked on both faces, and about half of the number have concave bases. Two other artifacts stand out because of their distinctiveness in the midst of this relatively specialized workshop; one is a flake of dark banded chert which has been retouched along one edge for use as a knife or scraper, and the other is a large chopping tool which has been rudely made by percussion.

West St. Modeste-3, because of its relative proximity to West St. Modeste-1, may actually be an extension of the latter site. It was discovered late one evening as we followed the winter sled trail back to camp, and there was no opportunity to take more than a quick surface check. The material was predominantly white quartz, with a few chips of fine-grained pink quartzite and one abrading stone of shale. Several fragments of leaf-shaped blades were collected: a hammerstone, a side scraper, and a keeled planing scraper. One of the blades is particularly interesting for it appears to be part of a crooked knife. One edge of this implement is perfectly straight, while the other is strongly convex from base to tip; the specimen has been well made of pure crystalline quartz, and the edges have been retouched by pressure-flaking on both sides.

Pinware West-3 had all the same characteristics as West St. Modeste-1, and the material from the two sites, as far as it goes, equates very closely. This site produced three smoothly-made triangular arrow points of quartz, and numerous other fragments of the same material which are less easily identifiable as to type, although they appear to be parts of blades and scrapers.

CAMPSITES

The third type of site discovered in Labrador was probably of the one-night-stand variety. West St. Modeste-2 and Pinware West-2 both seem to have been such briefly used campsites, judging from their limited extent, their small hearth signs, and the few sporadic chips and scrap artifacts which they contained. Each of these campsites was associated with a raised beach, although at widely divergent levels.

West St. Modeste-2 stands on a narrow bench forty-one feet above sea level. The profile consists of a surface turf two to three inches thick beneath which is a zone of coarse, reddish-gray, waterlaid sand that contains throughout its ten to twelve inches of depth a scattering of rounded stones and small pebbles. The culture lay at the base of this latter zone and directly on top of a layer of mixed beach sand and gravel. Apparently the site was originally associated with the beach itself and at a subsequent time was buried by a flood deposit from the slopes above.

The material was found *in situ* around a charcoal-blackened area in the sand which also contained a few fragments of rocks that appeared to have been cracked by fire. The dominant aspect of the artifacts located here, with one or two exceptions, is their crudeness and roughness. One basal fragment of a lanceolate point has been percussion-flaked from chert and has a shallow retouch along the edges. Another point is a stemmed trianguloid of flint (Fig. 66, *b*, *13*), and there is also one example of a small leaf-shaped point of quartzite. The several quartzite blades found are crudely percussion-flaked; one seems to be part of a large, pointed chopping tool, and the others are leaf-shaped (Fig. 66, *b*, *4*). Scrapers from this site are similarly crude; one is a section of a core which has been flaked off at one end, and two others are quartzite flakes which have been worked by percussion along a single edge.

The site of Pinware West-2 was in some respects the most interesting spot investigated during the entire summer. It is located in a large blowout at an elevation of 140 feet above sea level, and the first finds were on a low gravel ridge which was exposed at the base of a cut bank. Exploratory trowelling back into the talus of this overburden opened up a hearth area which lay directly on top of beach sand and gravel. Chips and artifacts were found *in situ* here. The profile of this site, measuring some eight feet in thickness, is considerably more extensive than any hitherto described. The present surface consists of a

thin and scanty covering of mosses and low-growing plants, beneath which is a three-foot stratum of wind-blown dune sand. Below the dune sand is a buried turf horizon three inches thick and underneath this another three inches of fine white sand. The next lower stratum is five feet thick and is composed of a red-brown sand which is densely packed and consolidated. At the base of this red sand, and on top of the beach gravel, the culture occurred. All indications suggest that the site was associated directly with the beach level.

The material found at this site is also interesting, for it includes a number of chips and one specimen of Tripoli. This substance, originally akin to chert or flint, has lost its bonding agent, due presumably to long and severe weathering, and it has become a sort of chalk. All these chips and fragments show the usual cleavage surfaces left after the removal of other flakes, but it is obvious from the present chalk-like condition of the material that such flaking would now be utterly impossible. The one whole specimen of Tripoli is a leaf-shaped, stemmed projectile point (Fig. 66, *b*, 14) of such thickness and coarseness that it probably could have been used only in a spear or harpoon. The flaking is bifacial, and although much of the surface detail has been lost because of erosion, this seems to have been done by a pressure technique. One edge of the implement bears a rough, shallow retouch.

Other specimens from this site, all found in association with the hearth, are variously made of conglomerate, quartzitic sandstone, and a fine-grained pink quartzite. One of these is a leaf-shaped knife which has been chipped by percussion alternately on both faces with a resulting sinuosity of the edges. (Fig. 66, *b*, 5). The remaining artifacts are coarsely made fragments of chopping tools.

LOCATIONS OF SITES INVESTIGATED IN NEWFOUNDLAND

Ireland Bight—See map, Fig. 65.

Port au Choix-1—On Calvary Point, north shore of Rich Point Peninsula. Note: All sites in the Port au Choix area are located with reference to U. S. Hydrographic Office Chart No. 1182, 10th Ed., Oct., 1919.

Port au Choix-2—First reported by Wintemberg as Phillips Garden. Half way between Calvary Point and Blanche Point on north shore of Rich Point Peninsula.

Port au Choix-3—On the property of A. S. Darby in the settlement of Old Port au Choix. Eastern shore of Rich Point Peninsula.

Port au Choix-4—On the easternmost tip of Port au Choix Peninsula, bearing WNW of Ardent Rock and Querre Island.

Port au Choix-5—On the property of James Billard, along the northernmost side of the neck separating the peninsulas of Rich Point and Port au Choix.

Port au Choix-6—On the property of Mr. Lavers, on the neck of land which separates Old Port au Choix from Gargamelle Cove.

Port au Choix-7—Approximately 100 yards east of Port au Choix-5.

Keppel Island—On Codtail Point, the easternmost spur of Keppel Is., which is situated in the mouth of Hawke Bay. See U. S. Hydrographic Office Chart No. 2680, 2nd Ed., May, 1946.

Norris Point-1—On the end of the point just outside the settlement of Norris Point in Bonne Bay. See U. S. Hydrographic Office Chart No. 1105, 21st Ed., Jan., 1943.

Norris Point-2—On Wild Cove Head, about one mile in a northeasterly direction from Norris Point-1. Chart No. 1105.

Woody Point-1—Around the lighthouse at the settlement of Woody Point, south shore of Bonne Bay. Chart No. 1105.

The period of slightly more than a week spent in the vicinity of St. Anthony and Hare Bay in northeastern Newfoundland was not too productive. Information was acquired which may lead to definite sites in the future, but during the side trip into Hare Bay only one location was discovered. This was in the small outport of Ireland Bight, and unfortunately it lay directly beneath the gardens and graveyard of the settlement. Since it was impossible to dig under those circumstances, I have from this spot only two artifacts which were given to me by Messrs. Levi Dawe and Levi Francis Reid. One is a large leaf-shaped flint knife slightly more than seven inches long, which is quite heavily patinated, and the other is a basal fragment of a lanceolate blade made of hematite. Both of these specimens show even flaking on both faces and a shallow retouch around the edges. No further information concerning this site is available, except that it is situated on a wave cut bench which now stands fifteen feet above sea level.

All further work in Newfoundland was conducted on the west coast between Savage Cove on the north and Bonne Bay on the south, and this area has a considerably different aspect from the coast of southern Labrador which lies just a few miles across the Strait. It tends to be low and featureless from Cape Norman

southward towards Castor River where the Long Range mountains trend closer to the sea. Everywhere it is heavily bushed, except in the immediate vicinity of the small fishing outports, and nowhere are there to be found the sand barrens which tend to simplify reconnaissance on the Labrador. The soil cover is thin and poor, and the limestone bedrock of the country crops out in numerous exposures.

In the area of Nameless Cove a leveling traverse was run up the raised beaches and they were found to correspond very closely with those on the Labrador side. The three major levels checked stand twenty, forty, and sixty-five feet above the sea, and the front line of each is an outcrop of shelving limestone. The rock at these levels exhibits the same fissuring and other signs of erosion which characterize the lowermost, present-day beach. As one progresses farther southward the raised beaches in western Newfoundland gradually lose their coincidence of level with those in Labrador. Back in the country the land levels off into an expanse of muskeg and ponds, in the northern portion of the Long Range Peninsula, and the next higher beach lies an estimated three to four miles in the interior. All of the sites investigated in western Newfoundland are located in close proximity to the present shoreline, although on higher levels which now stand between fifteen and thirty feet above the sea. One exception to this is Norris Point-2 where artifacts were found beneath the sod at the top of a sixty-foot bluff on Wild Cove Head in Bonne Bay.

All of the sites may be classed as major occupation areas, and they fall into two groupings which will be described separately. The first of these includes Port au Choix-1, 2, 5, 6, and 7, Keppel Island, and Norris Point-2. Keppel Island and Port au Choix-2 and 5 were first visited and checked by Wintemberg. The numbers 2 and 5 for the Port au Choix area are my designations for sites which he called more or less by their local names, Phillips Garden and James Billards Place, respectively. These are the sites which can be labeled Dorset-like, and they have a high degree of similarity, particularly in their contents which are strikingly microlithic, exhibit the same types, and are made of the same materials.

Members of this group are also characterized by a basic likeness in their soil profiles. The most frequent combination consists of a thin surface sod, generally not more than one inch in thickness, which overlies a two to eight inch stratum of dense black loam. This loam is shot through with sod roots, and beneath it is waterlaid sand and mixed gravel which reaches downward to undetermined depth. The culture horizon is in all cases the layer of black loam. In Port au Choix-6 and 7 there is an additional element in this profile; beneath the surface sod is a zone of red, peaty forest soil that is soft, friable, and full of sod roots. Beneath this soil comes the black loam with its usual culture content. Where this red forest soil occurs there is a thin gray calcareous zone, about one-half inch thick, which marks the junction of the black loam with the sand and gravel below it. This appears to be the effect of leaching through an acid soil to the sand and gravel which has its origins in the basic limestone of the country.

Whereas the black loam is always the culture zone, as noted, there are certain variations which should be mentioned. In a site such as Port au Choix-7, where portions of the excavations were obviously made in someone's old potato garden, the artifacts were thoroughly mixed throughout the entire depth of the black loam. In the same site, off to one side where a further test pit was dug in an undisturbed section as evidenced by the occurrence of the red forest soil, artifacts were found only on the upper surface of the black loam at its junction with the red soil above it. In Port au Choix-6, where the red soil also occurred, the black loam was only one to two inches thick, and culture was observed throughout these two inches. Port au Choix-2 presents another variation of the theme. This site, although it is called Phillips Garden, has apparently never been gardened, but has served instead as an occasional pasture for the few head of horses on the peninsula. Three facts tend to corroborate this supposition: the oldest living people in the area state that it never contained any gardens; the surface of the site exhibits no signs of former gardens which would be evident in the form of definite and regularly-spaced ridges running up and down the slope; the black loam contains a plethora of food bone debris from the site, all of which shows a uniform state of preservation, such as would not be the case if the land had been plowed or spaded over. In this situation,

where there has apparently never been a forest cover, as suggested by the absence of the red soil, and where there has not been any undue disturbance of the profile, artifacts occur throughout the entire depth of the black loam. It is difficult, therefore, to do more than merely tie the culture to this particular stratum. There is no observable stratigraphy within it, although it may be suggested that the variable position of the culture within this zone indicates something in the way of a time differential.

The material obtained from these seven sites further substantiates the inventory described by Wintemberg. Of the various arrow points found, by far the most common and distinctive form is the small trianguloid of chipped flint. The great majority of these have been worked on one side only with a fine, even pressure technique; the other side may be either carinated or bulbous, and is generally unworked except in some cases for a slight retouch about the base. The bases themselves show considerable variation (Fig. 67, *a*, *13-17*), and may be either straight or have different degrees of concavity. Certain of these specimens have had well-defined longitudinal flakes removed from the base on one or both faces, and thus have a fluted appearance. Trianguloid points which have single side notches (Fig. 67, *a*, *18*) seem to be a variant of the above general form. On some points these notches look accidental, but in others they are clearly purposeful and uniformly made. One more variant of the trianguloid point is represented by two specimens which have double side notches (Fig. 67, *a*, *11*, *12*); in each case these are evenly placed near the base of the point, and both artifacts have been bilaterally retouched.

Leaf-shaped points were distinctly in the minority. There are only two specimens of this form, one of which has been rather crudely flaked and retouched on both faces; the other is a stemmed variety with unilateral flaking and one smooth core side.

Leaf-shaped blades found in this group of sites numbered only three, although there were numerous fragments which may have come from large artifacts of the same form. The small, double-pointed knives found at three of the sites are beautifully-made little tools which have been bilaterally flaked (Fig. 67, *a*, *8*). Two other artifacts may be classed as percussion-flaked blades: one of these is a fragment of chert core from Port au Choix-2 which looks like part of a rough chopping tool with a series of crude flake scars along one side of one edge. The other, from Port au Choix-5, is made of pink quartzite, and is a fragment of what may once have been a long blade with a lozenge-shaped cross-section. The edges of this are rough and sinuous, due to the removal of alternate percussion flakes on both faces, and there is a narrow facet along one side of the blade which shows definite signs of having been polished.

One of the most characteristic finds in this group of sites was the lamellar flakes. These are always made of flint, chert, or crystalline quartz, and they range in length from one to three inches. The concave core surface is smooth, and the exterior surface usually has two or three longitudinal facets. Of a total of ninety-one such flakes collected, twenty-six bear evidence of actual retouching along one or both edges, and some of the latter also have tiny side notches close to their bases. These flakes denote an amazing skill in the techniques of stone chipping employed by the occupants of these sites, and the relatively small proportion of those which have been reworked suggests that most of them are mere scrap material. It is possible, however, that more of them may have been utilized as tiny knives or gravers than can be determined from the marks on them at present (Fig. 67, *a*, *10*).

Scrapers of many sorts were found, most of them small. The majority are flakes or core fragments that bear a retouch along one or more edges. Two forms, however, are outstanding in this group. One is a concave scraper of chipped flint that has been worked on a flake so that it would be suitable for shaping down something the size of an arrow shaft. The other form is a small, snub-nosed scraper which, together with the small trianguloid arrow points and the lamellar flakes, has one of the largest representations of all the specimens found in these sites (Fig. 67, *a*, *19*). Most of these scrapers resemble the trianguloid points in size and shape, although they are of course considerably thicker at the base. Many have had their tips broken off, presumably while being utilized as hafted implements. All of these specimens have been made on flakes; the under, or core side, is untouched,

while the upper surface has been worked by pressure-flaking along the sides and across the blunt, snubbed end.

In the miscellaneous classification of chipped stone tools, three picks or gravers were found at two different sites. These are characterized by a single pointed end which appears to have been purposefully made by the removal of one or more longitudinal flakes. One of the specimens resembles a paleolithic burin in the stoutness of its tip, whereas the others are more delicate and may be no more than specialized scrapers.

Ground and polished stone specimens from this group of Dorset sites are all fragments of blades. These are bevelled on one or both edges and on one or both surfaces. The cutting edges thus formed are sharp and true (Fig. 67, *a*, 5), and the bevelling was also the means of cutting up the shale into sections of desired size. One specimen shows the grooves that were sawed into each face until the connection was thin enough to break. Three of the smaller fragments each have a single notch on one side near the base, indicating that they may have been lashed into some sort of haft. Only one specimen was found which had been fashioned both by chipping and grinding techniques. This is a small chert chisel or scraper from Port au Choix-5 which has been flaked down to rough shape and sharpened with a cleanly-ground bevel across one end.

Fragments of steatite pots or lamps came from four of these sites. Varying degrees of refinement are shown in these specimens, ranging from smoothly-worked surfaces and carefully-turned exterior and interior corners, to pieces that have been very crudely gouged out. It is impossible to estimate either the size or the shape of the vessels from which most of these fragments come, although several show flaring sides, thick bottoms, and thinner walls. The bottoms of some are heavily encrusted with carbon, and two of the pieces have patching holes. These holes have not been made with a drill, but have been scraped through from both sides (Fig. 67, *a*, *4*). One fragment has a shallow runnel which extends from a hole to a broken edge, and this may be for the purpose of keeping the lashing flush with the surface. The most complete specimen of this group comes from Woody Point on the south side of Bonne Bay. It was given to me by Mr. Alexander R. Roberts who dug it out of his garden about thirty years ago, and it is a steatite lamp which has been very roughly gouged out of a small boulder. The specimen is irregularly pear-shaped, has an over-all length of eight inches, and its side walls flare widely. There is a slight groove which starts near the inside center of the lamp and runs up one side to the edge, but there are no indications of a wick ledge. Flecks of carbonization appear on both the interior and exterior.

Specimens of worked bone were relatively infrequent in all of these sites, and the total from the group under discussion is a mere ten. The greatest variety came from Port au Choix-2, a site which also contains vast amounts of food bone debris. The most easily identifiable fragment is the head portion of an eyed needle in which the opening has been formed by incising a small hole near one side so that it was bridged over by a small arc of bone (Fig. 67, *a*, 3). Another specimen seems to be a bow section of a sled runner (Fig. 67, *a*, *1*). The upper surface of this piece is grooved, and there are two incised holes near the head end. The narrow rib which separates these holes has been cut away on the bottom side so that the lashing would lie flush with the surface. The other artifacts of bone are not easily recognizable. One appears to be the butt end of a socketed lance point (Fig. 67, *a*, *2*); the point end is missing, but there are grooves on each side, and there was originally a small gouged hole near one edge, although the outer bridge across this has been broken away. Other fragments show signs of having been worked and polished, but they are not identifiable.

While in the Port au Choix area I made a brief side trip to Keppel Island to visit the site which Wintemberg described there. I was particularly interested in seeing the jumping stones, or *nangissat*, which he noted there (Wintemberg, 1939, p. 87). Codtail Point, however, has altered considerably during the past twenty years because of its vulnerability to ice action in the mouth of Hawke Bay, and I found that along the northern shore a tremendous gravel bar had been piled up and all signs of the jumping stones had been completely obliterated. Up on the point itself, fifteen feet above sea level, a few additional specimens were collected on the surface and

in the uppermost one inch of shingle which litters the point. These tended to occur in concentrations with scrap chips, but nowhere in any sizeable amount, and there were no visible signs of any features such as house depressions or foundations. The artifacts found here paralleled the forms already mentioned for this group of Dorset sites, and only one new type was noted. This is a chipped stone crooked knife which has one straight and one curved edge (Fig. 67, *a*, *7*). The only other artifact which bears any resemblance to this is a basal fragment of a knife found at Port au Choix-2.

I have reserved discussion of two other Newfoundland sites until this time because they appear to have some significant differences from the group just covered. These are Port au Choix-3 and Norris Point-1. The former is essentially the same site as was mentioned by Wintemberg (1939, p. 86) on the property of Mr. A. S. Darby, but in this case I was able to conduct some excavations and acquire material which adds a new light to the local picture.

In 1946 Walter Billard, while spading over new ground to extend his house garden on the seventeen-foot terrace, exposed a remarkable cache of quartzite tools. I had an opportunity to make a brief study of this collection, and I was also able to purchase eight of the specimens. The cache included sixty-four implements and large flakes of translucent gray quartzite and nine flaked cores of chert: it was located in one heap about eighteen inches in diameter, buried at the base of the six-inch layer of garden loam, and directly beneath it was coarse waterlaid sand and gravel. The specimens include large leaf-shaped and semi-lunar blades (Fig. 67, *b*, *1*, *2*), and a large number of scrapers. All of these have been percussion-flaked on both sides, and many show a light, shallow retouch around the edges. The flint cores had been flaked but showed no other signs of use. A foot or so away from this main cache, Mr. Billard found another small pocket at the base of the black loam which contained four arrow points; these were all leaf-shaped forms, bilaterally pressure-flaked, and one of them was corner-notched and stemmed.

In order to check the location of this cache in the profile, and with the hope of finding some additional material, I dug a test trench across the back of the garden. Portions of this excavation clearly indicated former disturbances of some nature, but toward the southern end of the trench an undisturbed section yielded a few artifacts *in situ*. These lay at the base of the dark loam which seems to have formed on top of a highly irregular duned sand surface which marks the former beach. The junction between loam and sand is a calcareous band similar to the one described for the Port au Choix Dorset sites. The specimens included two leaf-shaped, stemmed arrow points and another with side notches (Fig. 67, *b*, *14*); all of these have been bilaterally pressure-flaked and exhibit fine workmanship. There was also one leaf-shaped knife which has been percussion-flaked on both sides and retouched at the edges (Fig. 67, *b*, *4*). Two small snub-nosed scrapers found here somewhat resemble those from the Dorset sites, although their stem parts have not been as carefully flaked and shaped.

I have four other specimens, two adzes and two gouges, which come from this same site area, although from a position on the next higher bench at an elevation of twenty-nine feet above present sea level. These were presented to me by Messrs. Pius and Ernest Billard, and in each case the finds were made some years ago as these men cultivated their potato gardens. The larger of the two adzes is long and oval in cross-section, and it is heavily patinated and severely eroded. The smaller is a fragment which has shallow side-notches about two inches back from the cutting edge; behind the notches the specimen is broken off, and the shape of the poll cannot be determined. One gouge is plano-convex and has only a shallow groove (Fig. 67, *b*, *5*), whereas the other is a well-polished specimen of greenstone which has a sharp, high median ridge along its back, and a deep, well-formed groove.

One other find at Port au Choix-3 is perhaps worthy of mention at this time, although the data are far from complete. About ten years ago, two skeletons were dug up beside Mr. A. S. Darby's barn, not far from Walter Billard's garden. Mr. Darby gave me what was left of them, and upon examining the remains I discovered six bone needles. Three of these are whole specimens, ranging up to six inches in length; each has one end which is somewhat spatulate, and one of them originally had

an incised eye in its head. The other pieces are fragments. Four of the specimens have a bit of incised decoration up their sides consisting of a series of short parallel lines across the stem, and in one case several cross hatches on one side of the head.

As for the skeletons themselves, there is little that can be said at the moment. I have only those more indestructible bones which survived ten years of knocking about in a wooden crate. They include the bones of one large adult, some of which bear traces of red ocher, and a number of fragments of a child's skeleton. Unfortunately, the skull of the adult is missing, having been given away some years ago as a curio. The only eyewitness reports of this find which I could obtain are rather conflicting, and it is difficult to ascertain just what sort of a burial it was. Perhaps the most reliable story indicates that the skeletons were found side by side in full-length position at a depth of about one foot below the surface.

One other Newfoundland site which appears to differ to some extent from the Dorset group is that of Norris Point-1. This was first mentioned by Wintemberg (1939, p. 88), and it has apparently been known on the coast for many years. At any rate, when I arrived and explored the ground I found that it had been riddled, and a few inquiries brought to light the fact that its contents had provided a very lucrative tourist trade at the steamer dock a mere two-hundred yards away. My only finds here were a number of chips and cores of pink quartzite and two specimens of this material which had all been by-passed as uninteresting or unrecognizable by the local hunters. One of these specimens is a thick, crude knife with sinuous edges formed by alternate percussion flaking on either side (Fig. 67, *b*, 3). The other is a rectangular fragment of the same material which has been used as a rubbing or polishing stone; the narrow opposite sides are worn smooth, and each shows the beginning of a shallow groove which cannot be further interpreted because part of the artifact is missing.

Before I left Bonne Bay, Mr. Bryant Harding of Norris Point presented me with his collection from this site. At one time this collection had been much more extensive, but I was glad to obtain forty-one specimens from a place that had otherwise been largely unproductive. The artifacts are all small and finely made of chert and flint. The only exceptions to the use of these materials are a tip fragment of a translucent gray quartzite point, and a trianguloid, ground stone point with two notches sawed into its base (Fig. 67, *b*, *10*). The majority of the points are leaf-shaped or trianguloid with side notches; only one has corner notches. There are no examples of the small trianguloid, concave-based points which are so typical of the Dorset sites, nor does Wintemberg mention that he found any of this type here (Wintemberg, 1939, p. 92). The points are mainly distinctive because of their long, narrow proportions, and while several have the concave shape of the original flake form from which they were made, they still have been retouched bilaterally in most cases (Fig. 67, *b*, *11-15*). Knives from the site resemble the arrow points, but have been classified otherwise because of their greater thickness. One small, double-pointed knife of chert (Fig. 67, *b*, *16*) is very similar to the knife found at Port au Choix-2. Three lamellar flake blades, two of them retouched, were also a part of this collection. Two other knives are unusual in that they each have one deeply concave side (Fig. 67, *b*, 8, 9). There are also four snub-nosed scrapers which differ from all others described in being side-notched just below their working ends (Fig. 67, *b*, 6, 7).

COMMENTS AND SPECULATIONS

It is not my purpose at this time to attempt any analysis of the above material, as I hope that work during the coming field season will increase the scope of both collections and data from the area. Perhaps a summation of the present state of affairs would be as appropriate.

The culture of the Beothuck Indians still cannot be described archaeologically in any total sense. Howley (1915), whose admirable monograph gives us our most complete picture of these people, did his work at a time when there was inadequate knowledge of the various cultural factors involved in Newfoundland, and his description of the Beothuck is, in my opinion, acceptable only for colonial times. Subsequent investigations have not been too enlightening, and we are faced today with a series of collections which have come ultimately from haphazard sources and which may

well be mixtures of all the culture forces which ever affected the island, whether Indian or Eskimo.

So far as I know, the only sites which may positively be identified as Beothuck all date from contact times, and these have not produced the types of artifacts which, when procured elsewhere, have been attributed to this people. Such types, according to Jenness (1929, p. 37), resemble those from Algonkian sites in eastern Canada and the United States and include triangular arrow points, tanged points of ground slate, long polished stone adzes (but no axes), discoidal hammerstones with thumb and finger pits on each face, and soapstone plummets. No pottery has ever been found on the island, but soapstone pots and fragments are known from numerous sites. The occurrence of this trait has produced a variation of opinion: Wintemberg (1940, p. 319) did not believe that these pots were of Beothuck origin, but according to Howley (1915, p. 332) the Beothuck are supposed to have made such pots and placed them in their burials.

There is a possibility that sites such as Port au Choix-3, Ireland Bight, and perhaps Norris Point-1 may shed some light on this problem. Material so far obtained from them is, of course, relatively slight in amount, but it appears to stand well apart from the contents of the Dorset sites in western Newfoundland. There are, furthermore, close resemblances in types, techniques, and materials which tend to link these sites with others on southern Labrador. The major difficulty, at present, is to identify this culture specifically; there is no particular assurance that it is Beothuck, for we must remember the possible inclusion of two other elements. Written accounts of stories told by the early white settlers in Newfoundland mention the friendly relations which existed between the Beothuck and the Montagnais of Labrador, and tell of the annual hunting trips which the latter tribe used to make to Newfoundland. While on the coast during the past summer, I heard similar stories from the present-day inhabitants who recalled hearing their grandparents speak of the Labrador Indians who made winter expeditions to the island. In addition to this problem of Montagnais influence, we do not yet have an adequate idea of the extent to which the Micmac penetrated the country when they began crossing over from Nova Scotia, a movement which is believed to have begun in pre-contact times. Therefore, it may well be that the Indian traces so far discovered on the west coast have no connection at all with the Beothuck, and certainly the aboriginal sites and remains which have been found in almost all parts of Newfoundland cannot be attributed to them alone, in spite of the report that they once dwelt throughout the island.

As for the Dorset manifestations in Newfoundland, I believe that Wintemberg's tentative identification of his west coast finds was perfectly sound. There are a sufficient number of type correspondences to link this material with Jenness' (1925) original analysis. We do not, however, have a very complete idea of Dorset culture, and it remains to be seen what new traits may possibly be added to their inventory as the result of further work in the Newfoundland sites. These sites do not show any definite signs of Thule influence, and probably this southern extension of the Dorset occurred at about the same time that the Thule began arriving in the northeast. De Laguna (1946, p. 106) believes that the Thule culture moved into the northeastern area around 800 A.D., and that for a subsequent period of some 200 years the Dorset culture mingled with it. This very relationship between the two peoples has made it difficult to obtain an exact description of the Dorset culture, and for that reason I believe that the Newfoundland sites may prove to be extremely important in the final analysis. In particular, I think that Phillips Garden, or Port au Choix-2, may be a vital spot; it is an extensive site, and it does not seem to be much cluttered by outside influences. I plan to give it a more thorough test during the summer of 1950.

A matter of immediate importance in this area is the presumed contact which occurred between Dorset and Beothuck. Jenness (1929, p. 38) has suggested that sometime before 1500 A.D. the Beothuck probably lived in Labrador in touch with the Dorset people, and that under pressure, perhaps from the Montagnais, Naskapi, or even the Eskimo themselves, they finally crossed over to Newfoundland. In the forty-mile stretch of southern Labrador which is most closely adjacent to Newfoundland, I have not yet found any particular sign of Dorset culture, at least as we know it on the

island itself. This negative evidence proves nothing, however, and merely emphasizes the need for further work in this section of the coast. There are, of course, isolated trait similarities, but the peculiar Dorset combination is lacking. Furthermore, it seems reasonable to think that the material from southern Labrador represents a long sequence of occupation, covering as it does such a wide variety of types and technologies. It is impossible at the moment to sort out the different influences, particularly on the lower beach levels, since most of the finds were made on the surface and their true relationships cannot be stated. In Newfoundland the situation is somewhat less bleak, and I believe there is some evidence which points toward actual contact between Indian and Eskimo in the vicinities of Port au Choix and Bonne Bay. This matter can perhaps best be considered along with the problem of the raised beaches.

I have made numerous references to the old strand lines which mark the coasts, and to me they constitute one of the most interesting aspects of the investigation. Apparently the land has been upwarping all through post-glacial time, and this movement is continuing today, if one can believe the stories related by the present-day inhabitants. Many of the more observant, older sailors among them tell of rocks and shoals which are now a definite hazard to navigation, but which in the days of their youth lay well below keel depth. We know nothing about the rate of this uplift, but probably it has been sporadic, otherwise the sea-cut benches at various high levels would not have occurred.

The presence of cultural remains on so many of these ancient beaches between fifteen and one hundred forty feet above present sea level seems to indicate that the coast has been long inhabited, but the matter of making an exact correlation in time between a given site and a raised beach is a difficult one. Such a correlation exists to my satisfaction at the lowest levels, and also at the highest one in the site of Pinware West-2. On the intermediate levels the status is less definitive. Typologically and technologically, one might expect or at least poignantly hope for a neat evolutionary series up or down these benches, but at present nothing of the sort exists. There are differences, of course, such as those which set apart the workshop sites on the one hundred foot level in Labrador, but these are insufficient for postulating, much less tracing, a culture change from higher to lower levels. On the other hand, the mere existence of these high beaches carries with it a potential of chronology, both relative and absolute, which may prove very fruitful for future research in the area. This is particularly true inasmuch as stratigraphy within any given site has not yet been discovered.

It is interesting to note that the sites of both Dorset and Indian (Beothuck?) in western Newfoundland are situated on the lowermost beach levels, down to the present fifteen foot terrace. This suggests an element of recentness which approaches contact times, but it may also suggest a longer than usual cessation of upwarping. At any rate, since remains of both have been found on the same seventeen foot bench within one-half mile of each other (cf. Port au Choix-3 and Port au Choix-6), there exists a distinct possibility that these two peoples inhabited adjacent sites within the same period of time.

Although all the returns are far from being in at the moment, I am of the opinion that the Beothuck Indians may have reached Newfoundland and settled there well before the advent of the Dorset Eskimo. At that time they were presumably a people adapted to the taiga and were the bearers of an archaic form of culture which has been recognized by several students as a widespread phenomenon in the northeast (Speck, 1926; Strong, 1930; Ritchie, 1944). Later, in historic times, the Beothuck are known to have had considerable proficiency in their pursuit of littoral hunting, and this fact enters into a mutual substantiation with Jenness' (1929, p. 38) recognition of certain Dorset features which appear in so-called Beothuck specimens. Among such features he has cited harpoon heads with rectilinear sockets; triangular arrow points of flint, quartz, and basalt; knives and points notched on each side of the base for hafting; and curved-edge knives of flint and quartz.

Thus, there was unquestionably a prolonged period of contact between the southern Dorset Eskimo and the Beothuck Indians, but we are not yet in a position to state clearly the extent of their indebtedness to each other. This contact may have been the medium through which certain Eskimo-like traits passed to northeastern Indians in the Laurentian, but we

need a far more definite abstract of Dorset culture content than we now possess, before it can be said that these people were the originators of such traits. Meanwhile, I believe it wise to keep alive the question of the circumpolar complex, and the possibility that both groups of people may have shared, to some degree, a common heritage.

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Dartmouth College Museum
Hanover, New Hampshire
May, 1950

ANCIENT POPULATION CENTERS OF SANTA ROSA ISLAND

PHIL C. ORR

AS A RESULT of work on Santa Rosa Island during 1947-1950, the Santa Barbara Museum of Natural History has completed a survey which includes 142 ancient Indian village sites. On the California mainland intensive cultivation, construction and pot-hunting have pretty well eliminated the natural surface conditions of Indian sites, but on Santa Rosa Island, due to its isolation, there are many sites untouched by modern man. Consequently, it was possible to set up a system of classification of the sites undisturbed by civilization on a basis of natural physical conditions.

The sites range from recent, including historic ones, in which well-preserved house pits with fairly well-preserved wood and fabrics of sea grass are present, to sites so old and weathered that only a vestige of shell, chipped stone or badly eroded mortars remain. Classification of sites is by number, from Class 1, in which the recent or late house pits of from 40 to 60 feet in diameter are present, along with perishables, to Class 6 which represents vestiges of sites only. Class 2 sites are low mounds, grassed over and not eroded, in which small house pits of from 10 to 20 feet in diameter are found. Class 3 sites are identical with Class 2, except that no house pits are in evidence. Class 4 sites lack house pits as well as grass, but the general form of the mound is preserved. Class 5 are badly eroded mounds or the opposite—deeply buried deposits under wind-blown sand or waterlaid deposits.

Santa Rosa Island, about forty-five miles from Santa Barbara, is one of the Channel Islands and is privately owned by the Vail and Vickers Cattle Company, through whose courtesy and cooperation the Museum was permitted to work on the island. The island, about 15 miles long and nearly as wide, is the second largest in the group, containing some 52,000 acres. A chain of very steep mountains runs down the center of the island from east to west, with very abrupt, steep canyons to the south coast. The north side of the mountains, while exceedingly steep, levels out at about 500 feet elevation into a broad flat plain or plateau-like expanse of grassland. It is cut with deep canyons which find their way to the sea through a 50-foot sea cliff, which virtually surrounds the island except in the Skunk Point area on the southeast section. The highest peak is about 1,500 feet.

On the east is Beecher Bay, with Carrington Point to the northeast and Skunk Point to the southeast. At Ranch House or Elder Creek a broad flat plain provides room for ranch buildings, corrals, and some cultivation. During prehistoric times a large Indian village was situated here, and on Carrington Point were many other villages. Further south, low hills covered with Torrey pine encroach on the sea and no village sites occur until Southeast Anchorage is reached. From there on around Skunk Point, which consists of a large basaltic hill largely covered with sand and a huge sandpit, many Indian sites occur.

Going west along the south shore, beaches are small and the entire coast is extremely rugged, but in the mouths of the larger canyons are found from one to five or six sites.

The extreme west end of the island is exposed to prevailing northwest winds and would today appear to be uninhabitable, but large mounds exist on this exposed section of all the islands. This is doubtless due to the abundance of sea food which even today is more plentiful on the west ends of San Nicolas, Santa Cruz, San Miguel and Santa Rosa Islands.

Coming east from the west end of the island along the north coast, many huge sites are seen, and then a rocky desolate stretch of coast breaks the chain of occupancy until Garañon Canyon is reached. From Garañon to Arlington Canyons a flat plain lies just under the 250-foot foothills, on top of a 50-foot sea cliff. In this area are many Indian sites.

On the plateau, or, more properly, benchland above, ranging from 250 to 500 feet elevation and dissected by three main canyons with their tributaries, are many more sites; even back in the mountains a few isolated sites exist.

For the most part, due doubtless to the supply of food, water and other necessities, villages tended to be grouped in thirteen physiographic areas (Fig. 68). The boundaries of these populated areas differ, but usually a deep precipitous canyon, a rough rocky coast, or high hills seem to determine the boundary.

To go from one of these populated areas to another is either difficult or just inconvenient. Roughly they correspond to such areas on the mainland as Mescalitan Island (Orr, 1943), Santa Barbara, Carpinteria (Rogers, 1929), and Rincon Creek, where Indian villages have been in use from the earliest times to the historical, and where whites, both Spanish and American, have continued to settle. Here on the mainland, with railway and highway, distance only means inconvenience, but in prehistoric times, forests, swamps and rocky hills tended to separate the areas from one another.

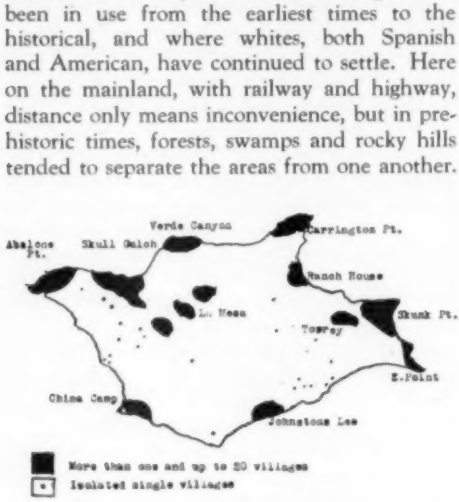

FIG. 68. Map of populated areas on Santa Rosa Island, Calif.

On the northwest section of Santa Rosa Island, centered at Skull Gulch, which is midway between Arlington (otherwise known as "Corral Canyon") and Garañon (spelled "Gallenon" by Stock, 1935) is a flat area about 50 feet in elevation, bordered on the north by 50-foot sheer cliffs to the beach and the Santa Barbara Channel, and backed up by steep grass-covered hills of 250 foot elevation, which are bisected by five canyons or gulches. Today it is comparatively easy to go from the Skull Gulch area to nearby Soledad Canyon or to Abalone Point [1] on foot, but while the distance is not over two miles, it will take three hours each way. Through the center of the area runs Tecolote Canyon and its companion stream Tecolokito[2] as well as the short but deep Skull Gulch.[3]

Within this area, including the benchland, for a distance of approximately one mile are 23 ancient Indian villages (Fig. 69). Each site is readily reached from another, but to go out of the area to other sites is far or difficult. It seems apparent that this area may be considered as typical of other population centers of the island.

If we assume that the normal population of Santa Rosa consisted of from eight to thirteen villages as is shown by Kroeber (1925) who names eight villages, and five more have been discovered by the Santa Barbara Museum which give every indication of being "late" if not ethnic, then these late or ethnic villages correspond to the thirteen areas of concentrated population and are surrounded by other villages of earlier age.

Of the 23 villages in the Skull Gulch area (Fig. 69) one is a Class 1 site, probably *Niakla* of Kroeber though he shows this site near Soledad Canyon. That this site (SBMNH Loc. No. 131.2) is a late site there can be no doubt. Not only were some 40 house pits in evidence but fragments of wood, sea grass matting and cordage and a few glass beads were also found. Adjoining is a small knoll with shell debris in which house pits are also present but much more weathered, and there is no indication of perishables being preserved. A cemetery (131.2 A) gives evidence of being earlier than the main portion of the site, as there is a three-inch deposit of waterlaid material over it, and there are also differences in the artifact inventory.

Several hundred yards to the west is Locality 131.7, which again has house pits showing, although nearly obliterated. These pits can only be seen when the grass is short and when the sun is low, so that long shadows are cast by the very slightly raised rim of the pit. On the top of the hill behind 131.2 and 131.7 are nine Class 2 sites and three Class 3 sites, while on the lower terrace, on the same level with the first-mentioned sites, are two Class 4 sites, three Class 5 sites and one Class 6 site.

[1] Maps of the Channel Islands leave much to be desired in the way of specific nomenclature. It has been necessary to name various features. Abalone Point will not be found on any maps as a named feature, but can be easily located on the War Department Corps of Army Engineers Map of Santa Rosa Island, California, Sheet 1, at Grid 1212 North, x 1077. This is by far the best map as yet published of the island.

[2] Recorded only on maps dated in the 19th century.

[3] Named by the First Santa Rosa Island Expedition and recorded on the unpublished official ranch maps of Vail and Vickers Co.

The Class 6 site (131.26) is presumably the oldest in the vicinity and shows its antiquity by the amount of erosion and deposition which has taken place. An adequate description is difficult because of the extreme erosion, but the main portion is on top of the sea cliff and is nearly destroyed by wave action. A small mound about six feet in depth and composed of steeply tilting strata is at an elevation of about 30 feet, while some 50 feet above the tide line are abalone shells imbedded in the sea cliff under six feet of waterlaid sand and clay, contiguous with the Pleistocene elephant beds exposed in the cliff. This higher portion appears at one time to have been connected with the lower deposit. A well-defined fault runs through the underlying bedrock but no positive evidence of the Indian strata being faulted was found.

Sites 131.1, 131.3, 131.4 and 131.6 are all Class 5 sites which appear very ancient. Human bone and shell were found exposed on the sea cliff 20 feet deep at 131.1. Shell, charcoal and animal bone occurs from 20 to 25 feet deep in 131.3 and 131.5. Human bones from these two sites, while not found at more than six feet, are buried in clean sand, yet coated with travertine. Locality 131.6 appears to be equally ancient, but a limited amount of sea grass cordage and a model wooden canoe were found here. Locality 131.4 is a huge sand dune a thousand yards south of the sea cliff. The north side of this dune has been cut away to a depth of 40 feet or more by wind erosion, completely eroding away two cemeteries and exposing a temescal or sweat house, so that the floor is now the highest point, with the walls tumbled down the sides of a cone. Observations at this site for three years has shown no recognizable erosion. Another portion of this site is well grassed over, although the forms of dunes are well preserved with a coating of shell. Two other cemeteries are known from this site.

In all, of the 23 villages within the Skull Gulch area, 17 burial grounds are known to have occurred, these in six sites. No excavations have been made in the other 16 sites, nor has erosion exposed burials.

If we look at the physical features of these sites and compare them with similar sites on the island, we find that Class 1 sites are

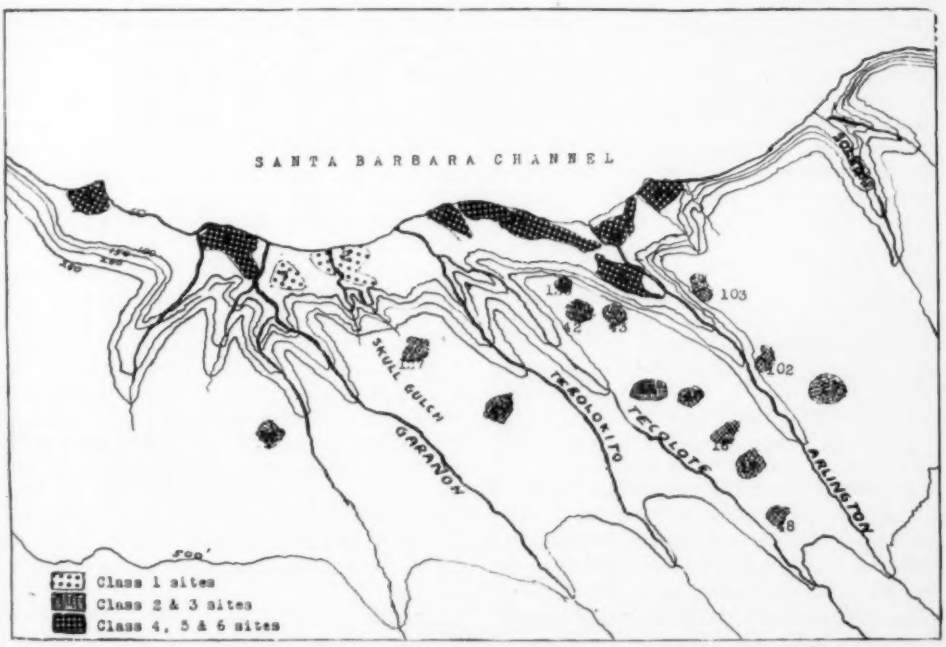

FIG. 69. Map of the Skull Gulch population area, Santa Rosa Island, California.

located on the lowest section of the coast line. Class 2 and 3 sites are located on the highlands, with Class 4, 5, and 6 located on sand dunes at elevations of from 50 to 80 feet. It might be argued that the class of the site is determined by its soil and exposure to the weather. This in part is true, but in the case of Class 2 and 3 sites, it is not uncommon to find both within a few yards of one another. Classes 1, 4, 5 and 6 also occur very close together, exposed to the same winds and weather and differing in their soil and location only in that 4, 5, and 6 are usually built upon sand dunes.

It seems apparent that the history of the inhabitants of the island can be roughly divided into three periods, Early, Middle, and Late. The Late period is characterized by a shell and fish-eating people who occupied the lower terrace and built large houses of sea grass, throwing their refuse just outside the door of their dwellings so that huge heaps accumulated. Circular depressions resulted when the houses collapsed. The "Late" includes the historic back to an undetermined point, but is further characterized by flexed, face-down burials or reburial in the latter phases. Orr (1943, pp. 31-32) classifies flexed, face-down burials as distinguished from reburial, as an "early" trait of the mainland Canalino. Mortars or pestles, although used, did not predominate the artifact inventory as they did in earlier phases. It appears that compared with earlier phases vegetable foods did not form as important a part of the diet.

The Middle period is characterized by villages located at higher elevations and away from the coast. Shellfish were utilized as food but there is a scarcity of fish remains. Mortars and pestles are also more common than in the Late period. Houses were smaller, about six to ten feet in diameter and the sites were located for the most part at some distance from any possible water supply. Little is known as yet of the burial habit, but indications are that flexed, face-up burial was practiced. Too little is now known of these people to make speculations as to the reasons for these high and apparently dry locations, but the obvious explanation of "temporary" villages seems to be ruled out by the depths (4 feet plus) of most of the sites. It may be this represented a period of warfare with the mainland or other islands, in which case the higher elevation would offer more protection. High elevation sites are also found on San Nicolas but their composition is much more like those of the following group.

The Early period people seem to have preferred sand dunes as a location. Nearly all sites either are on large, well-developed dunes, or are stratified in dunes from well down in the bottom to thirty feet high of alternate layers of shell and wind-blown sand. Shellfish were utilized as food, but to a lesser degree than in the Late. Fish remains are very scant, though mortars and pestles, indicating a vegetable diet, are very common. Of the shells used, the red abalone, *Haliotis rufescens*, predominates. They are much commoner here than in the Late, which give rise to a speculation that these people may have lacked canoes for fishing but were excellent swimmers and divers. The red abalone is found only in deep water, whereas the black abalone *Haliotis cracherodii* occurs at tide line. The physical make-up of the skeletons suggests a virile muscular race, which gives credence to such a supposition. No detailed study of physical characteristics has yet been made of the Santa Rosa Islanders on a basis of age, but Early skeletons appear larger and more rugose than those of the Late. Burial of the Early people varies from one cemetery to another within the Skull Gulch area, but flexed, face-up or on the side seems the rule. In Locality 131.3 Cemetery A, flexed sitting up was the rule. No evidence of housing has come to light in these early sites.

Gifford (1916) and Schenck (1926) have estimated the age of California mounds by means of depth and content. So far, no detailed study has been made of either depth or content of Santa Rosa mounds in the Skull Gulch area, but if we admit the argument that a comparatively small area like the Skull Gulch population center can support only one village at a time, yet twenty-three villages are known to have existed within this area, we must further admit that the depth of the deposits—representing the total age of the site—is not four or ten feet, or even thirty feet as shown at Emeryville, but the total of each of the twenty-three sites after it, within the area.

Locality 131.26 shows a definite 6 feet of deposit. Assuming that to be the earliest in the area it has been placed at the bottom of

the hypothetical column shown in Figure 70. The other Early sites show depths, respectively, of approximately: 131.1—25 feet, 131.3—25 feet, 131.4—6 feet, 131.5—25 feet, 131.6—14 feet. This totals 90 feet, which in part is waterlaid, and in part, wind-blown sand.

Class 2 and 3 sites appear to average from four to six feet in depth, although no accurate measurements are at present available. As an estimate, these amount to about 45 feet. Class 1 sites, three in number, amount to about 26 feet maximum, although again no positive data are available for all three sites.

The grand total for the Skull Gulch area on a basis of estimate only is 167 feet. Whether you wish to accept this figure or not is immaterial; but if you wish to estimate age of a site on depth only, you must consider the depth of adjoining sites within the population center. At the present time, it is impossible to correlate the respective sites in their relative sequence. Sites 131.1, 3, 4, 5, 6 appear to be Early. It is very doubtful that all existed at the same time, but as yet we do not know enough of their characteristics to place one above the other with surety. In the case of the Late sites, 131.2 Sections I, II, and III, it appears that II is the latest or Historical phase. Section I probably predates the contact period only by a few years, while Section III probably represents a much earlier phase, but whether earlier or later than Locality 131.7 is as yet undetermined. It is quite evident, however, that a total of approximately 26 feet of refuse has been accumulated during this so-called Late period.

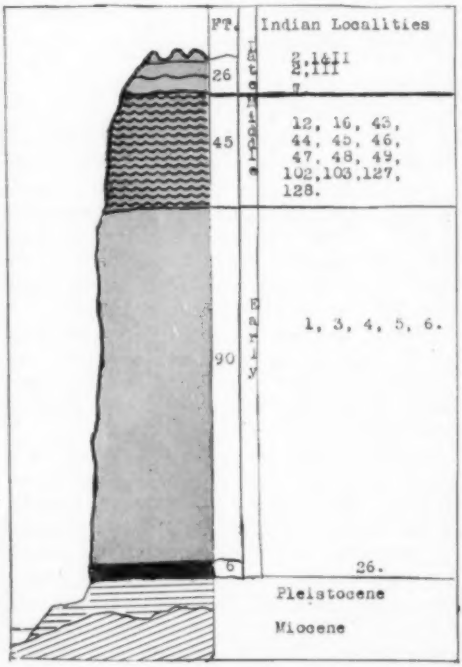

FIG. 70. Hypothetical archaeological column of the Skull Gulch area, Santa Rosa Island, California. Depths are estimates, classification of sites according to age are tentative. (Prefix 131. omitted from locality numbers.)

To the writer it is inconceivable that man has spread from Asia to Cape Horn in a mere two thousand years, that the sixty-odd dialects of California Indians would have developed in the short span (geologically speaking) that has passed since the birth of Christ. "Officially" three thousand years seems to be the maximum accepted for California shell mounds; the author feels that we must greatly extend our estimates of time—backwards.

CONCLUSIONS

If we admit that certain areas, because of natural features, are populated for long periods of time, then we have thirteen such population centers on Santa Rosa Island, best shown in the Skull Gulch area of the northwest coast. Here twenty-seven villages have occupied an area which would only support one village at a time, indicating that there have been twenty-seven phases of village life in the area. These twenty-seven phases might be grouped into three major periods, designated as Late, Middle, and Early, and these periods can be roughly determined by the physical location and condition of the sites, according to their Class. Class 1 is Late, Classes 2 and 3 Middle, and Classes 4 to 6 Early. Each of these periods represents a great depth of deposits, so that in order to estimate the age of the early sites we must take into consideration the age or accumulative depths of all sites within the population center. The Chumash-speaking people were the last to live on the island. There is no indication as yet that either the Hunting

People or the Oak Grove (Rogers, 1929; Orr, 1943) ever reached the island, but there is a suggestion that three distinct cultures, including the Canalino, were present. Whether these will be found to be phases of the Canalino or distinct cultures awaits further work.

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Santa Barbara Museum of Natural History
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GOLD ARTIFACTS OF CHAVIN STYLE

S. K. LOTHROP

SEVERAL years ago, the writer prepared a paper (Lothrop, 1941) on the gold objects of Chavín style found in two graves at Chongoyape near the north coast of Peru. At that time reference was made to a third group of Chavín gold work which the owner, the late Mr. Joseph Brummer, did not then wish to have published. (Five Brummer specimens were illustrated in Kelemen, 1944, seven in Larco Hoyle, 1941.) Since Mr. Brummer's death, the nineteen specimens in his collection have passed into the hands of the Hon. Robert Woods Bliss and Doctor Vladimir G. Simkhovitch, who have granted permission to publish their beautiful acquisitions and have most kindly provided photographs. I am also indebted to a friend in Lima for permission to illustrate a Chavín specimen from his collection and to Professor W. C. Root for analyses.

The contents of the two Chongoyape graves which had been published previously were stylistically distinct. One grave contained comparatively massive objects which had evidently belonged to a man, including crowns, ear discs and tweezers. Analysis of one of the crowns by Professor W. C. Root proved it to be of gold with platinum as an impurity. No copper or silver were present. The second grave contained much thinner objects, some of which seem appropriate for a woman, such as pins, paints, a stone bowl, pottery and an anthracite mirror. A gold pendant in the form of a crab and a small gold sheet were analysed. They also contained no silver or copper. The shaft of a pin with a gold head had 74 per cent silver, 26 per cent gold and no copper. There were three bodies in this grave, which may have been a man and his two wives.

The Brummer specimens were at one time in the collection of Mr. Juan Dalmau of Trujillo, Peru, who told Mr. Rafael Larco Hoyle (1941, p. 141, Fig. 204) that they had been found at Chavín de Huántar. Mr. Brummer told me the same story and added that the original purchase had been made in the town of Recuay in the inter-Andean valley known as the Callejón de Huaylas. Chavín is located on the eastern side of the Cordillera Blanca. Recuay is on the western side on the road to the coast. The Recuay district, however, yields not Chavín style archaeological

artifacts but types which have been named after the town. This suggests that the collection was not found near Recuay and that it may well have been found in the vicinity of Chavín.

Figure 71 illustrates a gold gorget. The flat rim is adorned with an angular guilloche. The center is rounded and is decorated by a cartouche containing a much conventionalized feline face. There are two small holes for suspension and most of the piece seems to have been painted dark red. The central panel of this gorget, as well as the decorated areas seen in Figure 72, illustrate a metallurgical technique not hitherto recorded in the New World, although employed for centuries in the Old. This consists, not in working from the back and beating out the design in relief, but in working from the front and driving in the background to produce the pattern. The result is called champlevé, the normal manner in which Chavín motives were produced on flat stone surfaces such as the famous Raimondi panel. The border pattern, unlike the central panel, has been embossed from the back.

Champlevé is characteristic of other early stone-carving styles, such as Pucará and Tiahuanaco, and it occurs in the molded adobe walls of later date at such sites as Chanchan and La Centinela. It did not persist as a metalworking technique after the Chavín period, however. From the similarity of the pieces here illustrated it seems possible that a single craftsman invented a new process which was not adopted by others and thus was forgotten. Many centuries later, however, the champlevé technique was again discovered. Examples may be seen in the metal work of the Chimu region, Ecuador and Coclé (Fig. 73, *a*, *b*), but it nowhere became common.

The guilloche on the border of the specimen in Figure 71 is not a common pattern in Chavín art. It occurs, however, on the back and sides of the big *lanzón* in the *castillo* at Chavín, now buried forever by a landslide, and on the Raimondi panel, where it terminates in serpent heads, thus giving a clue to its symbolism.

I can find no guilloches in Salinar or any subsequent Peruvian culture with the exception of eight gold gorgets from Huarmey in the American Museum of Natural History shown in Figure 73, *c* (Goddard, 1921; Bennett, 1932, p. 21) and a specimen in the Bliss collection. W. C. Bennett (1946, Pl. 50) has assigned these and the associated specimens to the Late Chimu period. This may be questioned, as the gorgets are similar in shape to the example in our Figure 71 and they have guilloches similarly placed on the flat rim. Of the objects associated with these gorgets, two are stirrup-mouth jars of gold with typical Mochica designs and Chavín-like handles; two others are large gold breast plates with parallel bands of different alloys. It can be demonstrated that this technique occurs in objects which were used in the Mochica period but not in Late Chimu times. Bimetallic nose pendants are an example. As Kroeber (1944, p. 90) points out, "Mochica contains a minute and easily separable Chavín ingredient."

The central panel in Figure 71 contains a highly conventionalized face (Fig. 74, *c*). The eyes, consisting of a dot partly encircled by a C-like element, are typical of Chavín stone carving. The U-shaped mouth is repeated on an often illustrated pottery vessel in Chavín style (Tello, 1929, Figs. 67, 34; Larco Hoyle, 1941, Fig. 211) and on an original carving from Chavín now in Lima. The snakes issuing from the mouth and covering the lower jaw recall a gold ornament, probably from Chongoyape, (Lothrop, 1941, Pl. XVIII, *b*), which also repeats the curious treatment of the nose with lateral ribs and upward curling brow ridges.

The concept of a deity with snakes issuing from the mouth is an old one and widespread in aboriginal America. Its earliest appearance seems to be in the art of Chavín, but the idea died out in the Mochica period in Peru. In Middle America a deity with serpents in the corners of his mouth is usually called by his Aztec name, Tlaloc. He can be traced through the earlier Tula-Toltec period and is represented in sculpture of the Maya Great period at Copan and Palenque.

The subject of paint on metals has never been studied. It seems probable that many more specimens were painted than we now realize and that museums and collectors have destroyed the paint under the impression that they were removing the products of corrosion. I know of a gold plaque from which a red film, supposedly cuprous oxide, was scoured. When the plaque later was analyzed, it proved

Fig. 71. Gold gorget. Actual size. Bliss collection.

to contain no copper and little silver. It therefore must have been painted.

It appears that all the pieces under discussion had been painted red or in one case black, either in whole or in part. Perhaps the effect desired was what now is seen, for the paint has worn off the more exposed surfaces and clings chiefly to the crevices. In the Chimu period, many centuries after Chavín, the use of paint on gold or silver again became common, especially in the Lambayeque region (Antze, 1930, Taf. 13; also Bliss collection), where green, black or red were employed. A painted metal specimen is known from Guatemala (Woodbury, 1948, p. 122).

Professor Root suggests that, inasmuch as some of these specimens contain a considerable amount of silver, the red coating may be the result of corrosion of that metal. We cannot agree because, if this were so, the corrosion would have taken place after the objects were in the ground and would be evenly distributed on both sides of the metal. In fact, however, the existing pigment is largely confined to the crevices. Furthermore, one specimen is painted black. This color could not have resulted from the composition of the metal and therefore must have been applied as paint.

A second plaque in Chavín style appears in Figure 72, *a*. It is shaped like a cross with the arms in matching pairs and presumably was sewn to a shirt, belt or headband. The narrower arms terminate in scrolls which flank a single serpent head with no teeth and a blunt nose. This is a minor motive seen so frequently in stone that it might be called a Chavín trade-mark. It is present in both lots of Chavín-style gold from Chongoyape.

The broader arms of the cross each contain a single conventionalized feline face (Fig. 74, *f*). Eyes, nose and mouth are comparable to the disc already considered, but in this specimen there are two sharp incisor teeth projecting from the corners of the jaw. When big teeth like this occur in Chavín art they are usually shown in interlocking pairs. The nature of the headdress is not clear but it contains a central triangular element, also seen in Figure 71. This is a fairly constant feature of flat symmetrical Chavín faces viewed from the front. It occurs on the Raimondi panel and on gold plaques from Chongoyape.

Figure 74, *a*, shows a gold gorget which, from the weight and style, may have come from the man's grave at Chongoyape. The contents of this grave were widely dispersed by the small boys who discovered them (Lothrop, 1941, pp. 251-252), and the present location of several pieces published by Tello (1929, Figs. 107-110) is now unknown. The plaque in Figure 74, *a* is of interest because the form is so much like the specimen in Figure 72, *a*, that a long separation in time seems improbable. They both are shaped like a cross with the arms in matching pairs. The narrower arms in each case terminate in a pair of spirals. The broader arms in Figure 74, *a* each carry a pair of conventionalized Chavín serpent heads. Both specimens have similar central panels with a pair of holes so placed that the plaques probably were sewn to a garment.

Figure 72, *b*, *b'* illustrates one of a pair of gold ear spools. The two spools are identical except that the design units, which represent a series of condor heads, face in opposite directions when seen from the front. Thus they would face in the same direction when worn in the ears. The decorative unit is shown in Figure 74, *b*; it consists of a condor head in profile with a serpent (head upside down) as a headdress. The condor motive does not appear elsewhere in the Chongoyape gold, but it is fairly common in flat stone carvings from Chavín. The stone presentation is different from the gold specimens, however, for usually a typical feline head with large tusks is shown and a condor beak is added in front of the mouth (Bennett, 1942, Fig. 3; Tello, 1929, Fig. 36).

The design on these ear spools was worked from the front and is champlevé, as may be seen from the illustrations. The shape is well known from nine examples discovered at Chongoyape, which could be arranged in chronological order because the owner's ears stretched as he became older and the drums increased in size. These Chongoyape spools, except for an unfinished pair, have cut out designs. In the present examples the background has been cut out in front of the beak and in the scrolls behind both the condor and snake heads.

The inner end of the tube to be inserted in the ears has been rolled over on itself to form a raised ring. In Figure 72, *b'*, it has been soldered to the tube and no joint is visible

FIG. 72. Gold gorget (*a*) and ear disc (*b*, *b'*). Diameters, 5½, 3¾ inches. Simkhovitch collection.

under the red paint. This process must have called for great skill and a knowledge of annealing.

Four nose ornaments appear in Figure 75, *a-d*. They all have flat central rings with openings for clipping them on the septum of the nose. Various elements project from the sides in matched pairs and are attached by soldering. In three cases they consist of serpents' heads adorned by small danglers. One specimen (*c*) has projecting arms of wire, twisted and welded to form a guilloche. Another (*b*) has spirals of wire soldered to the outer edge of the central ring. Gold danglers are seen on the rim of *a*. In *d* there is no decoration on the rim, but there are two pairs of serpent heads projecting to the sides as well as what looks like a pair of poppy pods. Danglers formerly were attached to all these. The guilloche and poppy-pod motives occur on the heads of pins from Chongoyape. These delicate nose ornaments, which project across the face like a cat's whiskers, are found in a larger and modified form in the Nasca region. They frequently are shown on painted pottery (Fig. 76) and gold examples are on record (Lothrop, 1937, Pl. XXXI) measuring as much as ten inches in width.

A pair of gold spikes surmounted by human heads are illustrated in Figure 75, *g* and *i*. These curious objects are hollow and are made of sheet gold. There is an opening at the back running from the neck to about half an inch from the point. Gold pins in Chavín style are known from Chongoyape, but they have solid wire shafts and the pieces in Figure 75 seemingly would not be effective as pins because they are too thick.

We call attention to the headdresses which are of two distinct kinds. These, it will be noted, correspond to the headdresses seen in Figure 77, *a* and *b*. All four objects may have served a common function and may have been manufactured in pairs. We suggest that the specimens in Figure 77, *a*, *b*, are spoons and those in Figure 75, *g*, *i*, were used as "forks" with a single tine.

Two gold tweezers are pictured in Figure 75, *f*, *h*. Both have small holes for suspension and presumably they were worn on a necklace as was the Peruvian custom in later times. The outline of *h* suggests the shape of hand axes used by Mochica warriors. Both specimens have red paint.

Chavín-style beads of sheet gold, fashioned in various shapes, were found in Chongoyape. The necklace in Figure 78, however, is at present unique. With one exception from Coclé, the beads are the largest gold beads known to the writer in the New World, although larger ones of silver exist.

FIG. 73. Gold discs. *a*, *b*, Sitio Conte, Coclé, Panama. Courtesy of Peabody Museum, Harvard University. *c*, Huarmey, Peru. Courtesy of American Museum of Natural History.

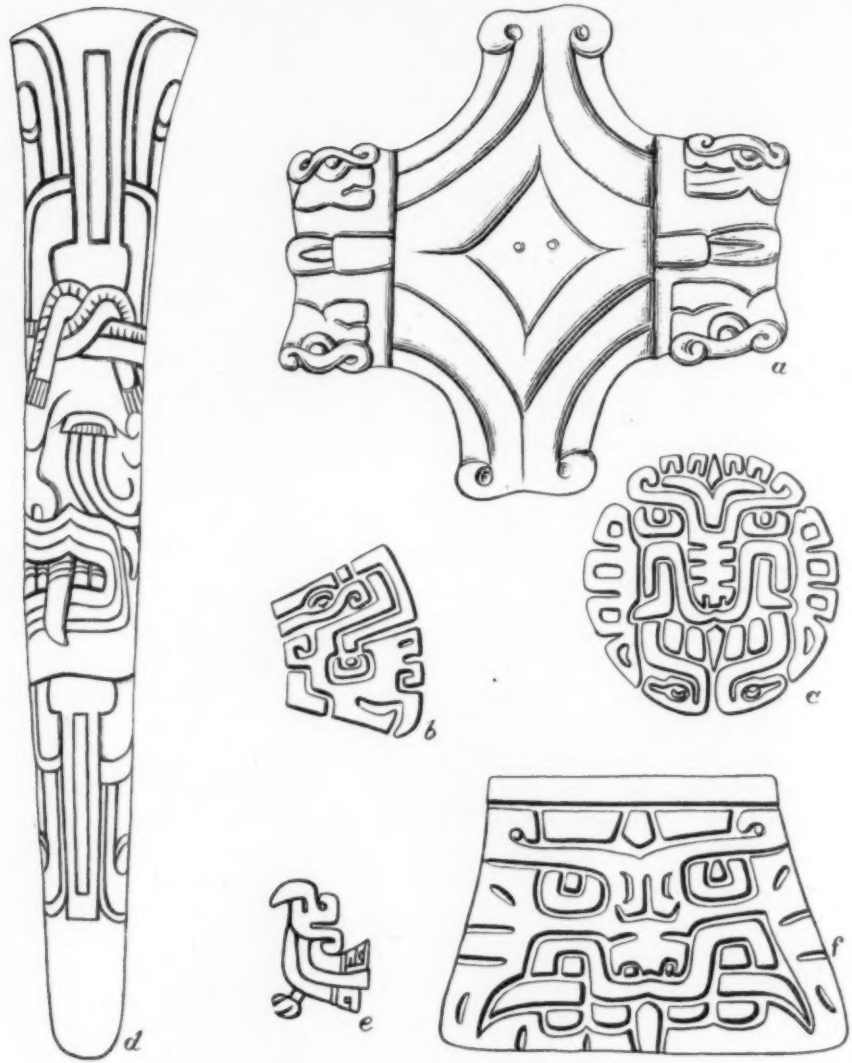

FIG. 74. Chavín designs. *a*, Peru. Private collection. *b*, Design unit from Fig. 72, *b*. *c*, Design unit from Fig. 71. *d*, Bone spoon, Hacienda Humaya, Huaura Valley, Peru. *e*, Design unit from back of Fig. 77, *a*. *f*, Design unit from Fig. 72, *a*. Scale: *a*, ½; others, 1/1.

The method of manufacture was as follows: A strip of sheet metal was trimmed to the proper size (Fig. 79, *e*) and was bent to form a C with a narrow opening and was rounded transversely to the outline of the bead (Fig. 79, *a*). Then gold wire was twisted to form a guilloche as in Figure 75, *c*, and was heated, hammered, and welded into a continuous flat sheet (Fig. 79, *d*). This operation was carried out so effectively that it is rarely possible to see where the wire crossed. Next, the openwork strip was bent like the solid one (Fig. 79, *b*). The two strips were then engaged at right angles with tips of each C touching the belly of the other and were soldered in place (Fig. 79, *c*).

In Figure 77 we show a series of gold "spoons" in Chavín style. Stone spoons with a definite handle and bowl like those we use today are associated with the Cupisnique (coastal Chavín) culture (Larco Hoyle, 1941, Fig. 149) and have been found in a tomb with gold (Lothrop, 1941, Pl. XIX, *d*). Spoons of pottery or wood were manufactured at a later period in Peru. Objects cut from the long bones of men or animals, often with elaborate decorations, are very close in form to these metal spoons and have been frequently found in Cupisnique tombs (Larco Hoyle, 1941, Figs. 155-163; Tello, 1943, Pl. XXIV).

The bone Cupisnique spoons usually consist of the head of a long bone with the shaft partly cut in half, a form repeated almost exactly in metal in Figure 77, *a*, *b*, *d*. The head of the bone, usually carved, thus serves as a handle. A second type, which we illustrate in Figure 74, *d*, has the shaft of the bone split completely in half and there is no definite handle. This specimen, with a face corresponding in many details to the face on the great *lanzón* at Chavín, came from a site in the Huaura valley which yielded incised Early Ancón pottery.

Of the four gold spoons shown in Figure 77, two have handles representing human figures in the round with considerable realism, and a third portrays a bird. Chavín stone-carving in the round is limited to large heads, mostly human or feline, with tenons at the back which were sunk into masonry walls (Kroeber, 1944, pp. 82-90). A number of effigy mortars and a small turquoise animal have also been found (Milliken, 1945, pp. 161, 163; Carrión Cachot, 1948, Lám. XI, Fig. 5). Kroeber (1944, p. 84) writes of the famous *lanzón:* "It comes nearest of any Chavín piece to being a statue, but appears to be a slightly-regularized monolith mainly of natural shape, covered with surface carving of a feline deity. . . ." This description covers recently discovered carvings at Kuntur Wasi (Carrión Cachot, 1948, Lám. XX, XXI, Figs. 15, 16). In modelled pottery, heads and fruits of various kinds are represented but only one complete human figure is on record (Larco Hoyle, 1941, Fig. 55).

The human figures on the first two spoons are not cast but are built up from sheets which were beaten to shape and joined together on the sides, a subject to which we will return. Both individuals are musicians. The standing man carries in his hands Pan pipes of four tubes, which are indicated by lines incised on his chest. Finger and toe nails also are indicated by incising. The seated individual is blowing on a silver conch shell which he holds in his gold hands.

Both figures wear caps and ear ornaments, in one case pierced as if to carry small danglers (Fig. 77, *b*). Both have holes for suspension in the back. The standing man wears a belt and breech clout. No clothing appears on the other, but there is a condor head on his back (Fig. 74, *e*) which suggests body painting. Above and below this the spine is suggested by incised lines. This figure squats on a drum-shaped object with latticed sides, which may represent the stools used in Chavín times.

A third spoon made in the same fashion appears in Figure 77, *d*. It consists of a slender cone of sheet gold with half of the base cut away to form the bowl of the spoon. The top carries a small hollow figure of a bird. A fourth spoon (Fig. 77, *c*) is smaller than the others and the handle is not hollow. It represents a typical Chavín serpent head with simplicity and dignity.

All the hollow spoons contain a pellet which rattles. In each case the opening into the handle has been closed by a small disc of gold soldered in place. The joining was so skilfully accomplished that it does not show in photographs.

In the center of Figure 78 we illustrate a flute of sheet gold. Bone flutes, often in pairs, are found in quantity on the coast of Peru. The present specimen is bent like the bones customarily used for flutes. We have seen bone flutes encased in thin sheet gold. This

FIG. 75. Miscellaneous gold objects. *a-d*, nose pendants. *f*, *h*, tweezers. *e*, staff head (?). *g*, *i*, forks with one tine (?). Actual size. Simkhovitch collection.

FIG. 76. Nasca mouth masks as shown on pottery.

specimen, however, is too small in diameter and too massive to have contained a bone flute. In the Chimu period flutes often were made of silver. They are straight tubes or tubes which have been severed diagonally and rejoined in the shape of the letter Z. The arched head on one end of the flute seems to represent a simplified bird. It apparently is of the same metal as the tube to which it is joined. The small gold birds attached to the tube by modern solder are of a different quality gold and definitely are not part of the original.

In the case of the gold spoons with hollow handles (Fig. 77), metal sheets were soldered together edge to edge. In the flute, however, the tube was made by rolling a sheet until it overlapped, then soldering it in place. The rather uneven edge may be seen on the left side of the illustration. The joining of the head at the top is also clearly visible.

In this paper and in a previous article on the two groups of Chongoyape finds we have described and illustrated all known metal artifacts of Chavín style. The fact that a third group, herein discussed, has become available for study makes it possible to draw more definite conclusions than formerly.

The outstanding fact about these specimens is that they reflect the symbolism and vigorous art exemplified in Chavín stone carving. The women's jewelry from Chongoyape is linked to the sculpture by typical snake heads. In the case of the man's ornaments from Chongoyape and the Bliss-Simkhovitch specimens, larger and more elaborate designs occur which approximate the stone carvings even more closely. These last two groups, from the point of view of art, rank among the finest products of aboriginal goldsmiths.

At the same time, these specimens are the oldest metalwork on record in the New World and have no known antecedents. Hence we may assume that the technical processes represent local inventions by the talented creators of Chavín culture. These inventions are listed in Table 13, which shows the status of Peruvian metallurgy throughout the ages. It indicates a decline in metalworking during the Salinar period which lasted into the Gallinazo, when casting was invented or acquired and copper was discovered. As a matter of fact, these so-called periods must have overlapped in part because there are direct links between Mochica and Chavín. Cultures which are successive in one valley may have been contemporaneous elsewhere, a possibility deserving greater attention than it has received.

The Chavín inventions began with noting the presence of gold and silver nuggets and learning the fact that these metals were malleable and could be beaten into sheets, which could be cut into any desired shape. Then came the invention of methods of producing patterns: embossing, champlevé, incising, and various combinations of these. There also came the discovery of the effect of heat. This included the knowledge of annealing which made it possible to soften metal and to hammer it into more elaborate forms. The discovery of solder made it possible to join sheets of the same or of different metals.

TABLE 13.

DEVELOPMENT OF METALLURGY IN NORTHERN PERU

Period	*Metals*	*Techniques*	
Chavín	Gold Silver (rare)	Hammering Embossing Champlevé Incising Cutout designs	Annealing Welding Soldering Strap joining Bimetallic objects
Salinar	Gold (rare)	Hammering Annealing Embossing	Cutout designs (rare)
Gallinazo	Copper Gold (rare) Silver (rare)	Hammering Annealing Embossing Simple casting	Soldering Gilding Overlays
Mochica	Gold Copper Silver (rare) Tumbaga ?	Hammering Annealing Embossing Cutout designs Casting	Soldering Gilding Silvering Bimetallic objects Tools
Tiahuanaco	Gold Silver Copper Tin (?-rare)	Mochica techniques, plus bronze?	
Chimu	Gold Copper Lead (rare) Silver Tin	All Peruvian metals, techniques and processes except metal in metal inlays.	

FIG. 77. Gold spoons. Actual size. *a*, Bliss collection. *Others*, Simkhovitch collection.

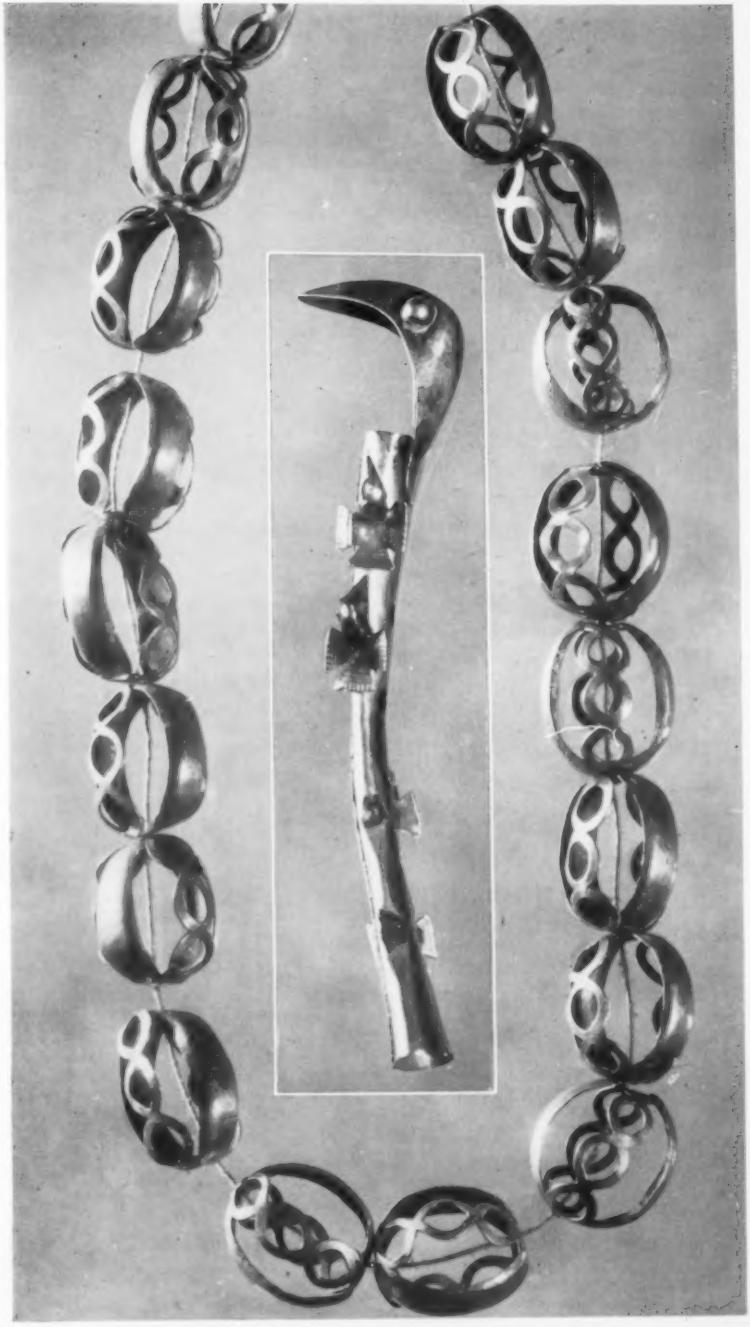

Fig. 78. Gold necklace and flute. Actual size. Simkhovitch collection.

This is a formidable list of inventions, but there were many basic processes left for future ages. Among these we may list a knowledge of other metals such as copper, tin and lead, the art of casting, the use of molds, the ability to make alloys such as tumbaga (gold-copper) and bronze (copper-tin), the various techniques of gilding and silvering, also the arts of sheathing and of inlays. Hence we see that while the Chavín craftsmen mastered much, they fell far short of acquiring the complete Peruvian metallurgical techniques.

Together with the knowledge of how to work metals came knowledge of what objects it was desirable to manufacture in metal. Owing to the luster of the material, metal obviously was suitable for articles of personal adornment, and the list of Chavín jewelry is similar to that which we use today except that ear plugs and nose pendants are not now in fashion. Many aboriginal metalworking groups never produced anything except jewelry, but the Chavín smiths also turned out such practical articles as pins, spoons and tweezers.

In Table 14 we give ten analyses of Chavín-style specimens. The first six are from the group discussed in this paper; the last four are from Chongoyape. The Bliss-Simkhovitch specimens represent three different types of metal, distinguished by the varying silver content and, in one case, by the absence of copper. Root (1949, Tables 1, 2, 3) has pointed out that the silver content of gold objects from the south coast of Peru falls into three similar categories with 0-5, 16-30 and 36-40 per cent silver. The earliest metal from this region is found in the Nasca and Paracas cultures. Of fifteen specimens analysed, eleven are in the first category and three in the second. Copper sometimes is present in quantities comparable to the Chavín specimens.

One of the Chongoyape artifacts in Table 14 is of silver with gold as an impurity. The others contained no silver or copper. One showed a trace of platinum. Obviously these metals did not come from the same source as the Bliss-Simkhovitch pieces.

The problem of relative age of the three groups of Chavín-style gold is an intriguing one. At present no stylistic sequence has been worked out either in pottery or sculpture. All it is possible to say is that the great *lanzón* entombed in the heart of the *castillo* at Chavín may be considerably older than the friezes, carved panels and heads which adorned the outer walls. Such an edifice must have gone through various stages of construction, and the late Dr. Tello's notes may contain a key to the sequence.

In regard to the gold, we have pointed out stylistic links with both the *lanzón* and the sculpture on the outer walls. It seems then that the gold was manufactured after the sculpture on the outer walls was completed. The *lanzón* must have been an idol of immense importance throughout the Chavín world and it is natural that it influenced art forms long after it was completed. That this actually happened is suggested by the bone carving in Figure 74, *d*, which may be described as a simplified miniature of the larger prototype.

Of the gold, the technically simplest lot came from the man's grave at Chongoyape. Embossed decoration in very high relief is characteristic. Ear spools have elaborate cutout patterns and inner rings which have been rolled and soldered. We believe that this group may be the most ancient.

TABLE 14. ANALYSES OF CHAVIN-STYLE ARTIFACTS

Analysis	*Object*	*Gold*	*Silver*	*Copper*	*Reference*
1344	Nose-pendant wing	52.6	40.0	7.4	Fig. 75, *b*
1347	Nose-pendant ring	71.0	22.0	6.8	Fig. 75, *a*
1346	Nose-pendant dangler	71.6	24.2	4.2	Fig. 75, *a*
1345	Gorget	72.5	23.7	3.8	Fig. 72, *a*
1348	Ear disc	81.2	14.3	4.5	Fig. 72, *b*
1349	Bead	96.6	3.4	0.0	Fig. 78
—	Crown,[1] Chongoyape	100.0	0.0	0.0	Lothrop, 1941, Pl. XVI, *b*
—	Strip, Chongoyape	100.0	0.0	0.0	Lothrop, 1941, Pl. XX, *h*
—	Gorget, Chongoyape	100.0	0.0	0.0	Lothrop, 1941, Pl. XX, *o*
—	Pin shaft, Chongoyape	26.0	74.0	0.0	Lothrop, 1941, Pl. XX, *c*

[1] Trace of platinum.

The women's gold from Chongoyape seems to be the most recent. It exhibits advanced techniques such as hollow gold beads, strap joining, soldering, and a bimetallic pin with silver shaft and gold head. On the other hand, the larger cutout objects show a loss in virility of line as compared to the other two groups. The two ornate pottery vessels found with the gold should ultimately serve to place it chronologically.

The Bliss-Simkhovitch specimens display all the known Chavín techniques. Some of the decorative details such as the guilloche and poppy pods in Figure 75, *c*, *d*, are repeated in the women's gold (Lothrop, 1941, Pl. XX, *d*, *g*) showing that there probably is not much separation in time. Yet the designs as a whole are executed with great strength though in a finer quality of line than in the man's gold from Chongoyape. The Bliss-Simkhovitch gold probably represents the full flowering of Chavín craftsmanship. We believe that it should be dated between the other two groups, although its characteristics may be regional rather than temporal.

The hollow figurines in Figure 77 mark the introduction of an exclusively Peruvian technique. In other regions, such as Mexico, Coclé and the Cauca valley, figurines were sometimes hollow cast, but in Peru they were hammered in various sheets of metal which were assembled and soldered. Figure 80 shows a Mochica example of silver. It represents a man playing Pan pipes, as in our Figure 77, *b*. Under Inca influence hollow figurines of similar construction were widely diffused (Lothrop, 1937, Pl. XL, *a*, *c*, *e*).

Another probable Chavín invention which persisted in northern Peru was the nose pendant. This was extremely common in the Mochica period, as represented in modelled pottery and by actual metal specimens. In the following Chimu period, metal nose pendants dropped out of use completely except in the Lambayeque region, where a few examples in gold have been found (Antze, 1930, Taf. 2, 6-9).

In conclusion we may state that Chavín gold was an early development, brilliant in style and in techniques of manufacture. It was, however, largely an isolated phenomenon which contributed comparatively little to subsequent cultures. Forms and processes apparently had to be created a second time. Chavín represents an unusual metallurgical stage when the melting of metal had been discovered and its use as a solder mastered, but casting in molds was still unknown.

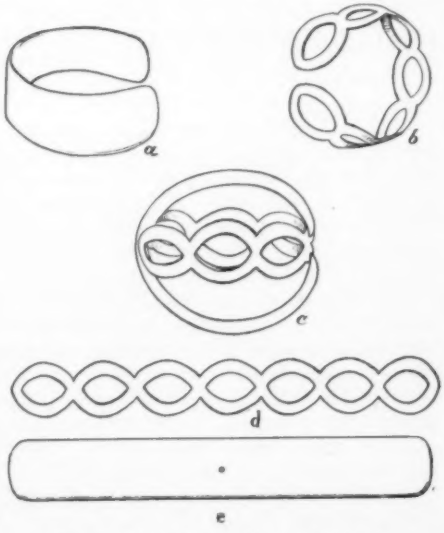

FIG. 79. Method of making a gold bead.

FIG. 80. Hollow Mochica figurine of hammered silver, Casma, Peru. Height, 6¾ inches. Courtesy of Museum of the American Indian, Heye Foundation.

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Peabody Museum
Harvard University
Cambridge, Mass.

A REVALUATION OF THE OLD COPPER INDUSTRY

SUZANNE W. MILES

COLLECTIONS of nearly 20,000 copper implements[1] of twenty-one general types, heavily patinated, all surface or near surface finds without apparent pottery association, found in maximum concentration in Wisconsin, have raised questions of their relative age and probable cultural affiliations. In 1942, after Ritchie's discovery of copper implements in pre-pottery Laurentian levels, W. C. McKern (1942, p. 167) formulated a provisional hypothesis. He defined the tools as the production of a pre-Woodland, preceramic people, centered in Wisconsin and spreading into adjacent territory, and subsumed all copper implements, not attributable to known cultures, as cases of the Old Copper Industry.

This hypothesis has been subsequently partially revised. At Osceola five types of Old Copper implements were present, associated with bundle burials and a stone complex. Ritzenthaler (1946, p. 69) defines Old Copper as contemporaneous with Woodland. Martin, Quimby and Collier include the Osceola material and retain and expand the McKern hypothesis in their examination. They explicitly restrict the area of the Old Copper Culture to "Minnesota, Wisconsin, upper Michigan and probably northern Illinois, eastern

[1] West, 1929, p. 60. In the late 19th and early 20th centuries, there were three major Wisconsin collectors, H. P. Hamilton, Francis Perkins, and Walter L. Wyman, who advertised competitively and extensively among farmers for Indian "relics and coppers" found in fields, banks, and local mounds. The collections of H. P. Hamilton are currently deposited in the Wisconsin State Historical Museum, and his correspondence, containing the scanty data available on the finds, may be read in the Historical Library.

Iowa and southern Ontario" (Martin, Quimby and Collier, 1947, p. 299). McKern (1942, p. 167) first observed the cultural distribution of copper artifacts and differentiated Old Copper by noting the preponderantly utilitarian character of Old Copper artifacts and their peculiarities of form.

Native copper was employed by a number of prehistoric North American cultures in the manufacture of a wide variety of ornaments, ceremonial objects, and implements. At least three sources of native copper, one in Alaska (Rickard, 1932, p. 5), one in Canada (Hearne, 1911, p. 197), and one in the United States (West, 1928, p. 42), are known to have been "mined" in prehistoric times for metal for ornaments and implements. Each source consists of outcroppings where lumps of nearly pure copper occur intermixed with weathered matrix. The richest sources of native copper in North America are the Keweenaw Peninsula in the southern region of Lake Superior and Isle Royale. Glacial action carried floats from this area into Wisconsin, Minnesota, Iowa, Illinois, Michigan, Indiana and Ohio. At Chitina, Alaska, prospectors and miners found both floats and outcroppings, which were used by the Indians of the Copper River district. Projectile points, large and small, were found in the sluice boxes of placer mines. The third source, the Copper Mountains of northern Canada, near the mouth of the Coppermine River, provided native metal for the implements of both Eskimo and Indians.

For Wisconsin Ritzenthaler (1946, pp. 53-54) lists the copper artifacts associated with Hopewell, Middle and Upper Mississippi, and Woodland, and reports that "all other artifacts were tentatively listed as belonging to the Old Copper Complex."

Outside Wisconsin copper artifacts occur in early and intermediate ceramic levels. Widespread but frugal use of copper for awls, straight sided celts, and beads is demonstrated in the Midwest and East. In cultures ancestral and related to Hopewell the increasing importance of copper for ornaments and ceremonial objects is revealed in the large number of artifacts and variety of forms. Middle and Upper Mississippi sites indicate a continued use of copper for thin sheet ornaments. Pins and awls are also present.

Although copper artifacts occur widely in a number of cultural contexts, they differ in form, as in Wisconsin, from the Old Copper implements, excepting awls and some beads. There are a few isolated cases of socketed blades found in burials of Hopewell affiliation (Cole and Duel, 1937, p. 110); but the occurrence is rare and probably represents trade items rather than local manufacture.

There are a number of reports of copper implements of Old Copper type in cultural contexts not defined as Old Copper. These suggest that a fresh examination of the apparent time range of manufacture and use of Old Copper type implements, and an investigation of the geographical distribution and cultural affiliations, would be pertinent to the definition of the hypothetical Old Copper industry.

Early Laurentian levels in New York provide evidence of a pre-pottery copper industry (Mayer-Oakes, 1949, p. 12, reports a small-eared copper projectile point found at Starved Rock, Illinois, in a preceramic level). Ritchie (1941, pp. 147, 238-243) reports copper awls, gorges, a gouge, an axe, and a chisel. These were accompanied by stone tools showing typological relationship to Maine's Red Paint culture. McKern (1942, p. 167) notes that the copper of Laurentian and parts of New England are "identically the same implements" as the Wisconsin Old Copper. The copper in New England is reported by Willoughby (1935, pp. 112-118) where he writes that it occurs sparsely in contexts of early ceramic cultures closely related to Maine's Red Paint. It might be further noted that the New England stone chisels, banner stones, tubular pipes and plummets are duplicated in Wisconsin Woodland.

At the Osceola site on the Mississippi River near Potosi, Wisconsin, Ritzenthaler (1947, pp. 53-70) found a number of Old Copper type implements in a shallow black sand cemetery containing an estimated 500 bundle burials.

The cemetery, a pit 20 by 70 feet, extends 5 feet below the turf and was exposed by the action of the river undercutting its bank. The lower 2½ feet contained the burials and the copper implements. Village debris was found throughout the 5 feet below the turf. Small Woodland sherds, flint projectile points resembling Illinois Black Sand (Maxwell, 1947, pp. 22-23; Cole and Duel, 1937, p. 140), winged drills and scrapers occurred, accompanied by hammerstones and smoothers. A few unworked galena cubes, lumps of red ocher and a few animal bones were found sporadically in the fill. There were several gray clay

wads an inch or two in diameter present in the burial layer. The skeletal material was in poor condition; only four more or less complete skulls were recovered. There was some evidence of partial cremation in several instances, and three stone capped graves were found, with stones placed over the bundles.

The copper implements were for the most part unrelated to the burials and were found scattered in the central area of the burial layer. Twenty-one awls, six socketed adzes or spuds, two socketed projectile points, one spatulate tanged knife, one socketed conical point, a number of tubular beads and scraps of ornaments were present. All these implements are assigned to the Old Copper industry.

Ritzenthaler (1946, p. 56) interprets Osceola as evidence of a non-pottery Old Copper site contemporary with, or surviving into, Woodland times in Wisconsin. He feels that the sherds in the pit "indicate that the fill had been taken from a... Woodland campsite." Although both the pottery and chert implements occur throughout the burial layer as well as the overlying fill, Ritzenthaler (1946, pp. 63-67) includes the stone complex as a part of the copper cultural manifestation, excluding the pottery. "While pottery was encountered in the bundle-burial layer, it could not be considered a part of the Osceola complex."

This interpretation raises questions of the possibility of segregating materials with common distribution throughout a fill. It would appear that the chert tools could not be divorced from the Woodland pottery.

The two sites of the Laurel focus (Wilford, 1941, pp. 240-243) of Rainy River aspect in northeastern Minnesota contained copper implements of Old Copper type. Burial mounds were constructed over the habitation sites, so the mound fill was rich in village debris. Bundle burials were placed in layers, accompanied in some instances by small mortuary vessels of Laurel pottery. A few skulls at one site had clay plugs in the orbits, and some burials were re-articulated. An extensive bone and flint complex was present, including socketed antler tips and harpoons of antler and bone. The mound fills contained mixed Laurel and Black Duck sherds and a stone complex with diamond and elliptical projectile points. The copper implements found were awls, gorges, thin knife blades, punches or small chisels, "crescentic objects, with prongs that were probably fitted into a wooden handle," and a bracelet. Small scraps of sheet copper occurred sporadically. The relationship of the copper to the burials is unstated.

A site of the Red River aspect (Wilford, 1941, pp. 243-246) related to Laurel but considered earlier, contained two copper spears or knives, one with a socketed tang, the other untanged with a straight base, and two large crescentic breastplates.

Certain similarities in these two cultures, Osceola and Laurel, may be noted. Both contain Old Copper tools not previously found *in situ*. Apparently the only tools in common are awls, although possibly the Laurel knife blades are similar to the spatulate tanged knife from Osceola. The description is insufficient for comparison.

Certain features of burial deserve comment. Although Osceola is a pit cemetery and Laurel has burial mounds, both contain bundle burials in layers, and the number of bundles in each case is unusually high, over 100 per mound in Minnesota and possibly 500 at Osceola. The gray clay wads Ritzenthaler found in the burial layer at Osceola might have been orbit plugs that had fallen out of the disintegrated skulls; these would be comparable to the orbit plugs at Laurel.

The burial sites were filled with village debris, in each instance, and the pottery in both are Woodland variants. Red ocher was present in the Laurel mounds and in the Osceola cemetery. However, Osceola lacks the bone and antler complex found in Minnesota, and the stone complexes appear to be quite different.

There is a report of a third Minnesota site containing Old Copper tools in a letter from G. J. Hulbert, the excavator, to H. P. Hamilton, Wisconsin collector of "Indian relics."[2]

[2] Letter to H. P. Hamilton, July 1, 1896, from G. J. Hulbert. Hamilton Archaeological Correspondence, Vol. I. The Hamilton letters also report the find by Willie Doty of Oconto, Wisconsin, of a single extended burial in a wooden tomb associated with Old Copper implements now in the collections of the Wisconsin Historical Museum. "Right along side of this skeleton I found a hatchet, . . . a copper knife, a copper chisel and a copper arrowhead." Later Doty found another socketed arrowpoint and a copper winged banner stone in the site. He reported that "the bones were all green, and after they were exposed they all crumbled to nothingness." Doty does not report the presence of any stone tools or pottery.

In 1896, with the help of two workmen, Hulbert opened a mound 100 by 75 by 18 feet. He complained to Hamilton that others had been there before him and carried away many relics, reducing the size of the mound considerably. The two workmen tunnelled through the center of the mound from the west. A good many bones were found, which were "disintegrated near the bottom, but nearer the top and half way down the skeletons were in fair condition. Many looked as though they had been dumped, some were sitting and some doubled."

Hulbert encloses a list of "relics" taken from the mound. The copper implements were "two wedge shaped copper tomahawks, three copper spears (socketed), one 7½ inches long, two slightly smaller, one copper hook, one double copper hook (?), several small scraps and a string of thirty copper beads, tapering each way from the center." One of the copper spears was found driven through the backbone and was sticking in the bone when found. Other artifacts in the mound included twelve bone needles (?), one bone lance, three bone knives, five bears' teeth, twenty-five tusk beads, flint knives, spears and arrowpoints and two small pieces of red paint. There is no mention of pottery in Hulbert's letter, but few early collectors were interested in sherds. With this exception the mound described could well be a component of Laurel.

Two general features of Laurel were present in an Old Athabaskan fishing camp in Central Alaska, which Rainey excavated, an extensive bone and antler complex and Old Copper type implements (Rainey, 1940, pp. 299-301). Hammered native copper arrow and spear points, some with rat tail tangs, awls, and needles, skin scrapers and ear and nose ornaments were uncovered in middens at Dixthada on Mansfield Creek. There were also "rubbed" stone adzes. No pottery was found, although occasional sherds occurred in nearby areas. Rainey places this material as proto-historic.

Investigation of Isle Royale campsites revealed Woodland and Iroquoian sherds in a refuse pit which also contained two small spatulate tanged knives. Here Quimby notes "the location of the camp sites is intimately related to the many prehistoric copper pits in the vicinity. While it is not certain, it is quite probable that the people responsible for the camp sites also operated the copper pits in proto-historic times. . . . Iroquoian-like pottery, which in the east might border upon the historic horizon, is found associated with camp-site material (1939, p. 223)."

Several northern hunting peoples are known to have made extensive use of native copper for implements in proto-historic and historic times. The Dogrib, Chippewayan, Yellowknife and Central Eskimo were carrying on an active trade in raw materials and finished products in the early contact period. The lack of archaeological research in the area restricts the descriptive and temporal data available to a few historic and ethnological reports.

Fragmentary historic notations of the use of native copper are augmented in 1771 by a detailed discussion by Samuel Hearne, an agent for the Hudson's Bay Company. Officials of the post at Port Prince of Wales, on the Churchill River, interested in the commercial exploitation of the Indians' copper, commissioned Hearne to accompany a group of Chippewayan on their annual trip to the Coppermine River at Coronation Gulf.

The trip to the Coppermine was long and strenuous, and the Indians delayed the visit to their "mine" to murder some Eskimos camped near the mouth of the river. From Hearne (1911, pp. 181-191) we learn that they plundered the Eskimo tents of

> . . . all the copper utensils they could find; such as hatchets, bayonets, knives, etc. . . . Their (Eskimo) arrows are either shod with a triangular piece of black stone, like slate or a piece of copper. . . . The men's bayonets and the women's knives are also made of copper; the former in shape like an ace of spades, with the handle of deer's horn a foot long, and the latter exactly resemble those described by Crantz. (Crantz, 1820, p. 128 opposite A, pictures an ulo with a central prong and a wooden handle.) Their (Eskimo) hatchets are made of a thick lump of copper, about five or six inches long and from one and a half to two inches square. They are bevelled away at one end like a mortise chisel. This is lashed into the end of a piece of wood about twelve or fourteen inches long, in such a manner as to act like an adze.

After further delay for victory celebration, Hearne and the Indians proceeded to the "mine."

> Before Churchill River was settled by the Hudson's Bay Company, . . . the Northern Indians had no other metal but copper among them. . . . This being the case, numbers of them from all quarters used every summer to resort to these hills in search of copper; of which they

made hatchets, ice-chisels, bayonets, knives, awls, arrowheads, etc. . . . With the help of a fire and two stones, the Indians could beat a piece of copper into any shape they wished (Hearne, 1911, pp. 197-198).

In July of 1821, Sir John Franklin traveled to Coronation Gulf and the Coppermine River.

The Indians report that they have found copper in every part of this range, which they have examined for thirty or forty miles to the NW, and that the Eskimaux come hither to search for that metal. We afterwards found some ice-chisels in possession of the latter people twelve or fourteen inches long, and half an inch thick, formed of pure copper (Franklin, 1821, pp. 528-530).... The annual visits which the copper Indians were accustomed to make to these mountains when most of their weapons and utensils were made of copper have been discontinued since they have been enabled to obtain a supply of ice-chisels and other instruments of iron by the establishment of trading posts near their hunting grounds (Franklin, 1821, p. 340-341).

Jenness feels, on the basis of ethnological evidence, that the Coronation Gulf Eskimo were an eastern people who were relatively recent in the area. He concludes that the Eskimo learned the use of copper from the Indians, possibly the Yellowknife of Great Bear and Great Slave Lakes who received their name from the extensive use they made of copper (Jenness, 1923, pp. 545-549).

Men's and women's knives and chisels have forms similar to certain Old Copper types. The crescentic blades with prongs found at Laurel are like the copper ulos, excepting the ulos have one central prong. Some Old Copper knives in the Wisconsin collections fit Hearne's description of the elongated ace of spades.

Hearne describes the Chippewayan methods of manufacturing copper implements as beating with two stones and heating the metal. Leonard Frank has made a metallographic study of certain copper implements, and finds that Wisconsin Old Copper type tools were repeatedly beaten and heated to relatively high temperatures in an open wood or charcoal fire. Thus, there is some indication that a common technology persisted in time from early levels into the 18th century.

Stefansson (1914, pp. 98-113) found the Eskimo of Prince Albert Sound still manufacturing and trading copper implements in 1903. The extent of European influence in the forms illustrated in his report is difficult to evaluate. The ulo is the same semi-lunar knife pictured by Crantz, but some question arises about the men's knives. A few appear to be copies of European knives, but a number have rat tail-like tangs, square or rectangular in cross section. The tangs are separate pieces riveted to the blade or are one with the blade which is double edged and pointed. Rivets are found in Old Copper types but only in the socketed forms; and all rat tail points or blades are made in one piece. But the general form of modern men's and women's knives belongs to the Old Copper categories. Other implements, needles, snow knives, harpoons are outside the Old Copper types.

If the implements of the Copper Eskimo and the northern Indians are included for comparative purposes, the cultures examined represent a respectable time period, ranging from pre-pottery in New York, through the intermediate levels represented by Laurel, into historic times. Only one site, Osceola, has been formally recognized as a manifestation of the Old Copper industry; its relationship to early Laurentian has been noted but the small quantity of copper in New York, the restricted number of types and the distance from the apparent center have argued against assigning any close relationship.

By arranging the implements from Wisconsin, defined as Old Copper, in categories or general types, we find that there are a minimum of 21. These may be examined comparatively with the types of implements from other copper using cultures. The rat tail tanged points or knives and the spatulate tanged knives occur in three of the cultural assemblages, while awls and chisels are most common, appearing in five. Excluding the sparse copper ornaments, which differ widely, any two cultures have at the most three types of copper implements in common with each other.

On the basis of distribution shown in Table 15, there were at least six cultures which employed copper implements of Old Copper type. In at least one case (the Eskimo) copper implements, not Old Copper in type, were also manufactured.

Significantly, implements of Old Copper types are found, with a few isolated exceptions, among northern hunting peoples, living north of the frostline of the prehistoric agricultural limit or on its southern margin. Four areas

where Old Copper implements are found currently appear to be approximately the corners of known distribution: the Alaskan Athabaskan on the west, the Eskimo on the north, Laurentian in the east, and Wisconsin in the south.

The fundamental similarities among the northern hunting peoples and the relations between the Eskimo and northern Indians have been discussed by both ethnologists and archaeologists. The ethnologists find a common fund of mythological and economic elements distributed throughout the taiga belt and largely held in common with the Asiatic taiga.

TABLE 15. OCCURRENCE OF CERTAIN OLD COPPER ARTIFACT TYPES

Old Copper Types	Wisconsin	Laurentian	Osceola	Laurel	Athabaskan	Chippewayan	Eskimo
1. *Pikes*	X						
2. *Awls*	X	X	X	X	X	X	
3. *Spuds or Adzes*	X	?	X			?	?
4. *Chisels*	X	X		X		X	X
5. *Gouges*	X	X					X
6. *Axes*	X			X		X	
7. *Rat Tail Tanged Projectile Points*	X				X	?	
8. *Knives*	X				?	?	X
9. *Socket Tanged Projectile Points*	X		X	X		?	
10. *Knives*	X						
11. *Conical Points*	X		X				
12. *Serrated Tanged Projectile points*	X				?	?	?
13. *Knives*	X					?	
14. *Spatulate Tanged Projectile Points*	X				?	?	?
15. *Knives*	X		X		?	?	X
16. *Straight Based Knives*	X			X		?	X
17. *Crescentic Blades With Prongs*	X			X		?	X
18. *Harpoons: Socketed*	X						
19. *Unsocketed*	X						
20. *Gorges*	X	X		X			
21. *Fish Hooks*	X						

If the number of types in each culture is compared with the 21 Old Copper categories found in Wisconsin, we find the following distribution:

Osceola	5	
Laurentian	5	
Laurel (including Hulbert's mound)	7, possibly	8
Alaskan Athabaskan	3, possibly	4
Eskimo Chippewayan	5, possibly	10

Archaeologists observe a wide distribution of bone and slate implements of like form associated both with Eskimo and Indian cultures. Martin, Quimby and Collier (1947, p. 303) guess that the relationship between Dorset and Old Copper is sufficiently close to search for the origin of Old Copper in the antecedents of that Eskimo culture. Strong (1947, p. 186) finds possible influence in the Norse. And Griffin (1946, p. 43) suggests that Laurentian may well represent a basic hunting culture which was important in the development of the more recent complexes in the northern area.

In Wisconsin there is a paucity of bone and slate, found in a few cases in Minnesota, but a profusion of copper forms *like* the bone and slate of the northeast and northwest. Indirectly, Osceola copper may be related to the north through Laurel, where northern slate and bone forms and Old Copper type implements occur.

The hypothesis of an Old Copper industry restricted to pre- and early Woodland in Wisconsin and neighboring areas is no longer tenable in view of the typological and distributional evidence.

The periods of time represented by the northern copper using cultures may be excessive if we accept the individual evaluations of sites and areas. Griffin (1946, p. 69) and Spaulding (1946, pp. 163-164) observe, however, that there is no evidence of great antiquity for Laurentian, and Griffin (1946) also suggests that it may be in part contemporary with Hopewell. The Laurel sites cannot be earlier than Hopewell, in Minnesota (Griffin, 1946, p. 69; Wilford, 1941, pp. 243-246). These considerations of relative dating may contract the time period represented by the Old Copper using cultures.

Currently the scanty evidence does not warrant the positive assertion of the close cultural relationship of northern copper using peoples. The paucity of archaeological data from Canada, especially, leaves gaps too wide to be filled by ethnological data and historic documents. It is possible that future evidence will establish the interrelationships which the distribution of types and techniques of manufacture imply, and place utilitarian copper artifacts as a special complex among northern hunters which reached an unusual early development in the Lake Superior-Lake Michigan area.

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6 Appian Way
Cambridge, Mass.
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THE SICKLE IN ABORIGINAL WESTERN NORTH AMERICA

ROBERT F. HEIZER

IT IS generally accepted that the specialized agricultural implements and techniques, and domesticated plants (with a few possible exceptions) of the Old and New Worlds are unrelated and independently developed. Parallel developments in agricultural accessories have occurred; the hoe and irrigation are obvious exemplars. The hand sickle, used to harvest cereal crops in the Old World, and to cut wild grasses in the New World, may now be pointed out as occurring in both hemispheres. The forms, materials, and function of the Old World sickle distinguish it from that of the New World, and it would appear that there is no specific connection between the Afro-Asian sickle used in farming and its North American counterpart used predominantly by incipient or non-agricultural native groups.

The oldest sickles known come from the Near East, specifically from the Lower Natufian (Mesolithic) of Palestine (Garrod and Bate, 1937, pp. 37-38, Pls. 13, Fig. 1; 12, Fig. 2, No. 6; Garrod, 1932, Pl. 22, Fig. 2), where they probably served as a grass-cutting tool. They are long, straight, thin, edge-slotted bone implements with straight-edged microliths inserted in the slot to form the cutting blade. These Mesolithic grass sickles might be more aptly termed grass-saws or knives since they lack the gathering curve of the true sickle. Incidentally, the occurrence of slot-inserted flints, so characteristic of the Old World Mesolithic and North European Neolithic, is a feature also known in the New World (Collins, 1943). Predynastic Egypt knew the straight flint-edged sickle. Later the curved sickle forms developed and diffused, presumably in company with the cereal crops, from the Mediterranean region. Unfortunately there is no adequate history of the sickle yet available, although Petrie (1917, pp. 46-47, Pls. LIV, LV) and Ebert (1928, pp. 71-74) contain general, but not exhaustive, discussions.

In Northeastern Asia, beyond the area of direct influence of the high civilizations, and in an area which never knew agriculture, we note the curved bone-sickle among the aboriginal Kamchadal of the Kamchatka Peninsula.

Krashenninikov (1764, p. 93) states that they "mow [grass] with a scythe made of the shoulder blade of a whale, which they whet so well by grinding it on a stone, that they bring it to a very good edge." Thus we may infer from the use of the word "sickle," a curved, flat form cut from the flat blade of the scapula and with the inside gathering curve sharpened. So far as I know, none of the neighboring aboriginal groups of northeast Asiatics know or use such an implement. The sickle could have come to the Kamchadal via the Ainu, or even the Japanese, from a further source in mainland China. Or, like a number of other material culture forms, the sickle may have been introduced to the Kamchadal from east to west via the Aleutian Islands. (For evidence of this cultural connection see Collins, 1937, pp. 280, 345, 375-380; de Laguna, 1934, pp. 217-220; 1940, pp. 71-72; Heizer, 1943.) A similar sickle form was in use on Kodiak Island according to Pallas (1781, p. 312) who wrote, "The Islanders (of Kodiak) had, for cutting grass, sickles made of a sharpened shoulder blade." No mention is made of the animal whose shoulder blade was used, but since the word "sickle" is used implying a curved blade and therefore of some size, the

FIG. 81. Mountain sheep horn sickles from Humboldt Cave, Churchill County, Nevada. Scale, approx. two-fifths actual size. All specimens in University of California Museum of Anthropology.

whale scapula seems indicated. The bone sickles of the Kamchadal of Asia and the Koniag of America constitute occurrences which may be related between themselves, but seem otherwise isolated insofar as the sickle is absent or unrecorded in the immediately adjoining portions of the two continents.

The evidence, upon which the identification as sickles of certain flat, crescentic tools of mountain sheep horn coming from archaeological sites in the American Southwest rests, is partly direct and partly inferential. Certain western native groups (Ute of Southern Utah; Ute of Gunnison, Colo.; Ute of Moab, Utah; Southern Paiute, Shivwits of St. George, Utah; Northwest Navajo of Tuba City) knew and used these tools as sickles for cutting grass, a fact recorded by ethnographers. But in addition to this positive identification, the archaeological specimens show evidence of some usage such as cutting grass stalks or seed heads. The handles of these sickles show how the tool was held so that the inner arc with the cutting edge became the gathering curve. The curved inner arc is sharpened and sometimes bears small filed V-shaped notches (Fig. 81, bottom specimen). Some specimens have been sharpened by scraping a sharp beveled edge with an abrasive tool which has left parallel scratch marks in the soft horn. This sharpening process must have become necessary as the cutting edge became dulled from long use. The dulled edge is smoothed, rounded, and highly polished. It is this high polish, which seems to be caused by wear as well as by a thin siliceous deposit picked up from contact with the grass stems, that constitutes strong evidence these tools were used to cut grass.[1] Julian Steward (1941, pp. 317-318) who describes five of these tools from Kanab, Utah, seems doubtful of their identification as sickles because of a series of small worn grooves or rounded notches along the inner cutting edge. The Humboldt Cave series now in the University of California Museum of Anthropology contains one specimen of this description, and the explanation of the notches is very simple and in no way contradicts, but rather reinforces, the conclusion that these implements are hand sickles. The horn of the mountain sheep is laminated and ridged. The flat sickles may be so cut and worked down that the laminae cannot be plainly seen (Fig. 81, top specimen). But the juncture of the laminae are weak points, or at least the horn is thinner there, so that abrasion proceeds faster at those points. The Humboldt Cave sickle shown in Figure 81, second specimen from top, clearly illustrates this feature of greater wear at the points the laminae join and where the horn is thinner, with less wear on the thicker ridges. Our specimen is similar to those described by Steward (Fig. 82, top specimen). If this explanation is accepted, Steward would probably agree that his implements are sickles.

FIG. 82. Mountain sheep horn sickles in Peabody Museum, Harvard University. Scale, approximately one-fourth natural size. *Top*, Barrier Canyon, S.E. Utah; *second from top*, Fremont River, near Fruita, Utah; *third from top*, Lovelock Cave, Nevada; *bottom*, Kietsiel, Segi Canyon, Arizona.

It is the region of the southwestern United States which has produced all of the sickles (except the Kodiak Island example) which stand as our North American examples. Figures 81 and 82 illustrate a series of these implements. All of the horn sickles are archaeologic finds, a fact accounted for by the nature of the dry cave sites in the southwestern United States.[2] The Caddo sickle made of a mandible

[1] The thin siliceous deposition on the cutting blades of Old World sickles is a well known feature (Burkitt, 1926, p. 55; Petrie, 1917, p. 46).

[2] These implements, though known to Indian informants, are not represented in any ethnological collections known to me.

collected in the last century by Edward Palmer, as reported by Swanton (1943, Pl. 16, Fig. 1), seems to be the only published ethnological specimen on record. This unusual piece, made from a deer mandible, reminds one of the early Egyptian form (Petrie, 1917, Pl. LV, Fig. 7, 8). Inquiry, through the University of California Culture Element Distribution Survey, concerning aboriginal sickles was instituted after the discovery of the Humboldt Cave specimens in 1936. Presumably sickles were not considered an obtrusive enough feature to stimulate informants to volunteer information on their presence until direct inquiry on presence or absence was made. O. C. Stewart's Ute, Southern Paiute, and Navajo informants claimed knowledge of the sheep horn sickle (Stewart, 1942: Element 676). Stewart's Northern Paiute informants did not recognize the archaeological sickles from Humboldt Cave, which is situated in Northern Paiute territory.

Kidder and Guernsey describe another specimen from a Basket Maker cave in Kane Co., Utah (Nusbaum, 1922, Pl. LXI, pp. 121-122). It is 12.5 inches across the curve, 2 inches wide, and three-eighths inch thick. The inner curve is well sharpened and polished from use. The curved horn sickle was first described by Kidder and Guernsey (1919, Pl. 46A, Fig. *c*). It came from a cave in Segi Canyon in northeastern Arizona and was called by them a scraper. The four horn sickles in the Judd collection at Kanab, Utah, and described by Steward (1941, pp. 317-318, Fig. 54) range from 8.5 to 9.5 inches, tip to tip. Loud and Harrington's (1929, Pl. 16, *c*, *d*) report on Lovelock Cave in west central Nevada lists two sheep horn sickles. They measure 13 and 16 inches from tip to tip. Guernsey and Kidder illustrate and describe what appear to be wooden sickles. The wood is hard and close-grained, and the specimens (there are two) fall nicely within the metrical range of their typological parallels in mountain sheep horn (length 12 inches). The inner curve of both pieces is sharp and highly polished; this is also a feature which does not contradict their identification as sickles. These wooden pieces are from Cave 14, a Basket Maker site in the Kayenta Region of northeastern Arizona. This listing of sickles comprises all the published sheep horn specimens known to me, ten in all.

Unpublished specimens relegated to museum storage or exhibit cases probably number a great many. I have been able to locate the following pieces: One mountain sheep horn sickle from a Basketmaker Cave in San Juan Co., southern Utah, is now in the University of Utah Museum of Anthropology. It measures 13 inches from tip to tip.[3] Five complete sheep horn sickles and one fragment came from Humboldt Cave, about 15 miles west of Lovelock Cave, Nevada. The archaeological report has not yet been published.[4] These pieces range in length from 10 to 13 inches. In the Los Angeles County Museum is a splendid example of sheep horn sickle from a Basket Maker cave on Cornfield Creek, San Juan Co., Utah.[5] In the Peabody Museum at Cambridge are 2 complete horn sickles from Fremont River near Fruita and Barrier Canyon, southeastern Utah.[6] The Peabody Museum also contains a small fragment of a horn sickle from Lovelock Cave. The U. S. National Museum contains one horn sickle from Bluff City, San Juan Co., Utah.[7] In the American Museum of Natural History are at least 3 such implements from Mummy Cave (Canyon del Muerto), Grand Gulch, and Grand Arch (White Canyon), Utah.[8]

With the mountain sheep horn (and wooden?) sickles we are confronted with the difficulty that always arises when a distributional analysis is attempted of an object of material culture made of perishable material and which characterizes an archaeologic culture or cultures. Distributional extensions may have vanished from archaeological sites, and the trait may not have survived into historic times. On the basis of native testimony, though unsupported by ethnologic specimens, the grass gathering and grain head tapping sickle of mountain sheep horn persisted until historic times in the general region where the archaeological concentration occurs. The main exception here is the lower Humboldt valley

[3] Information from Elmer R. Smith.

[4] Heizer and Krieger, n.d. Collection in University of California Museum of Anthropology.

[5] Information from A. Woodward.

[6] Information from Donald Scott, former Director of the Peabody Museum, Harvard.

[7] Information from N. M. Judd, former Curator, Division of Archaeology.

[8] Information supplied by N. C. Nelson, Curator Emeritus of Prehistoric Archaeology.

area of Nevada which yielded nine archaeological specimens from 2 cave sites, but where the modern Indians (Northern Paiute) deny knowledge of such a tool. Since the sheep horn sickle was anciently used here, we may explain its ethnologic absence to either abandonment or to a population change. At any rate, a large number of archaeologic material culture forms with which the sickle was contemporaneous have altogether passed out of use in this western Nevada region (Loud and Harrington, 1929, pp. 18-28, 110-123).

At least three other items of material culture, each as unique as the sickle, have a somewhat similar distribution and time perspective. These are the L-shaped awl made from an animal's scapula, the atlatl, and the flat, curved grooved club. All three types are well established in Anasazi Basket Maker times and sites, and were noted in the Lovelock and Humboldt caves in west central Nevada.[9] The curved club (but not the awl or atlatl so far as is known)[10] persisted in somewhat altered form and function into historic times. There seems to be no functional connection between the sickle, atlatl, scapula awl, and curved club, and it is only because their respective histories have been linked, perhaps as part of a variable and widespread culture complex, that attention is called to them here. Just how this culture complex might be defined is hard to state, but judging from its archaeologic manifestations which represent temporal as well as trait inventory differences,[11] it seems basically a hunting-gathering culture with chief dependence on hunting with nets or the atlatl, and on collecting wild seeds.[12] Grass itself, gathered with the sheep horn sickle, was used in great quantity as an industrial material for making matting, thatching, pit-lining, and beds. Basketry was important and used for collecting seeds, storage, parching trays, and cooking. It is this whole grass-utilization aspect which seems to furnish a convenient niche for the sickle, for wild grasses and rushes are easily cut in quantity with a knife, but difficult to gather with the hands alone.

Perhaps the simplest explanation of the Southwestern horn sickle is that it is a local specialization of a grass-cutting and seed-beating implement by people who were acquainted with the technique of working mountain sheep horn. The existence of these sickles rests upon two facts: first, the natural range of the mountain sheep whose horns were used, and second, their preservation in the dry cave and shelter sites of the Intermontane-Plateau region. Were it not for such dry sites, it is to be doubted that we should even suspect that such implements ever existed. Whether we may postulate a wooden prototype of which the horn sickles are imitative forms (skeuomorphs), or whether the curved horn sickle is a primary invention whose origin in a horn-working culture was suggested to some native artisan by a longitudinally halved or split horn with its natural arc are purely theoretical and unfruitful conjectures.

The question of whether the American sickle is derived from the Old World cannot be answered. We must await the recording of more data on the origin, development, and diffusion of the sickle in Asia, and more specifically its history in northeastern Asia. The Kamchatkan-Kodiak Island occurrences, in view of the similarity in types and use, may be historically related. The possibility of this particular connection is further strengthened by an increasing accumulation of data showing cultural contact between Kamchatka and the Aleutian Islands areas. The geographical separation between the Kodiak Island sickle and the Lovelock Cave specimens is so great as to preclude the thought of a connection without

[9] On the L-shaped awl see Cressman, 1942, pp. 63-65, 139; 1943, p. 244, Map. 13. For the atlatl see Loud and Harrington, 1929, Figs. 16, 18, pp. 110-111, and Cressman, 1942, p. 69. For the flat curved clubs see Heizer, 1942; Guernsey and Kidder, 1921, pp. 88-89.

[10] The single historic atlatl from the southwestern United States is that collected by Vancouver in 1792 from the Chumash. It is probably of post-Spanish introduction (Heizer, 1938).

[11] For present purposes I have in mind Anasazi Basket Maker II (S. Utah, N.E. Utah), Lovelock and Humboldt Caves (W. Nevada), and Catlow Cave (S. Oregon). For detailed discussion see Steward, 1940. The L-shaped awl seems to have spread southward to the Basket Makers (Cressman, 1942, pp. 65, 139; 1943, Map 13) while the flat curved club and sheep horn sickle appear oldest in the Basket Maker sites and later at Lovelock and Humboldt Caves (Heizer, 1942; Steward, 1940, p. 365). An opinion on the debatable atlatl question is at present impossible.

[12] Basket Maker II is incipiently ceramic and agricultural.

occurrences in the intervening area. In the light of present knowledge the Old and New World sickles appear to bear no relation to each other, though fuller data from both hemispheres ultimately may indicate a genetic connection in the remote past.

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University of California Archaeological Survey
Department of Anthropology
University of California
Berkeley, California
September, 1950

KIRK BRYAN — 1888-1950

It was difficult really to know Kirk Bryan; one accepted, without fully appreciating, his truly extraordinary ability. His spirit, his humor, his friendliness, and above all his real interest in all the problems of his colleagues obscured for some the scope of his knowledge and his willingness to apply this knowledge without regard for traditional barriers. Kirk considered himself a scientist and he defined science in the broadest of terms. Though a geologist by profession, his work was never limited by customary definition either within that field or outside it, as his almost incredible bibliography indicates. In addition to his publications in geology for which he is renowned, he is equally well known for contributions to botanical, archaeological, and other fields.

It will probably never be possible to estimate the stimulus value of the long discussions he had with his colleagues. Through such discussions his contribution to science goes far beyond his published work. He loved these opportunities to employ his ceaselessly active mind. None of us who have brought problems to him will forget the way in which he applied his broad conception of science to any problem. Ideas from such discussions have been incorporated in the basic doctrines of archaeology, as well as in other fields.

There is a certain futility in an attempt to pay tribute to Kirk as an archaeologist. What he did, and was doing when he died so suddenly, transcends such an arbitrary limitation. The idea that he might be called an archaeologist would amuse him greatly; "practicing without a license" he would call it. Nevertheless, he has, upon occasion, done work which was archaeological in import, and his humanity has enhanced the value of it. He thought of the people themselves and how they made a living in the changing environments which his investigations brought to light. Many of us will remember his long discussions of Pleistocene geology. They were often in the nature of lectures on complicated geological problems which he could explain so that people in other fields could understand them and contribute their own data.

Although Kirk had probably seen archaeologists during his early life in his native New Mexico, it was not until about 1923 at Pueblo Bonito that he came in contact with them professionally. Here he recognized the value and use of potsherds and other cultural debris in the study of arroyo cutting and sedimentation which he had previously begun, and which he carried on for many years afterward. This famous series of studies demonstrates his ability to collaborate with colleagues in different fields, and to select with acumen and with a sense for practical value, facts and hypotheses contributing to the solution of a problem. As the studies progressed they became of increasing significance to archaeological work because the cycles of sedimentation and erosion were synchronized with cultural events, the whole forming a setting for human prehistory.

This work set the stage for much of Kirk's later research. Concurrently with investigations in which geological problems appeared as a central theme, he included, wherever possible, archaeological ideas and hypotheses. Archaeologists will remember his great interest in artifact typology and distribution together with discussions of what might be called human ecology. At the same time, just for example, he was reading every publication on pollen analysis in America, and publishing critical papers. For fifteen years or more he was deeply concerned with a set of botanical problems which bore upon soil phenomena, cryoplanation as he called it, and other factors. The results of these studies were carried the full circle, giving rise to more adequate interpretation of the locus of the remains of man.

Bryan was one of the best critics of significant phases of archaeology that we have ever had. When categorical and biased assumptions that man was young in the New World were rife, he was most impatient but, as always, politic. He has said that he even told his early geological students that if they ever found remains of "Early Man" they should cover them up quickly and say nothing, but never to forget about them. Bryan himself, in his study of the Lindenmeier site, which was then almost unprecedented in America, finally destroyed the prejudice which had clogged archaeological thinking for a generation or more. As is well known, his principal interest was Early Man, but he never lost sight of other developments, particularly those involving chronology. His constructive criticism has greatly influenced the development of present opinions regarding Early Man.

Bryan's analysis at Sandia Cave testifies particularly to his brilliant and ever-practical ingenuity. He applied his knowledge of the processes of soil development to the difficult problem of defining a sequence of events in the cave in such a way that they could be correlated with climatic fluctuations of the Pleistocene. Of equal importance is his careful study of the deposits in Ventana Cave just recently published. In addition to the specific results, he takes the reader through the terminological difficulties which have developed in geological circles, so as to supply the archaeologist with a series of definitions and statements of the concepts back of them. This to a large extent aids the archaeologist, and I suspect many others, in understanding what their geological colleagues are saying.

Minnesota Man was a discovery in which Bryan was deeply interested. His outspoken criticism of those who tried to discredit the find by bringing to bear pedantic technicalities, reveals his faith in his fellow man. The ensuing investigation, in collaboration with geologists and others, exhibits Bryan's characteristic thoroughness. His clear, and extremely practical argument has been instrumental in establishing the authenticity and significance of the skeleton and associated artifacts.

These scattered notes are inserted only to provide brief examples of the kind of important work which Bryan did. There exists a wealth of additional and equally significant data which only time will bring to the fore.

The shock occasioned by Kirk's death is still with us. It will be a long time before we can readjust ourselves to it. One finds oneself thinking of him at unpredictable moments and in the midst of conversations with scientists from many fields. "I feel as though I have lost a favorite uncle," is one person's comment, that comes closest to expressing our feeling. The idea applies to formal, professional relationships, as well as to more intimate moments. He was gregarious and his friendship and above all his sense of humor were never failing, even in a debate where he could be a formidable and tenacious antagonist. Archaeology has lost an almost irreplacable consultant and scientist, but more than this, archaeologists have lost a true friend.

FREDERICK JOHNSON

FACTS AND COMMENTS

SOME CHARACTERISTICS OF MONGOLIAN-TYPE LAMES *

Recent reports on Alaska by Solecki[1] and by Giddings[2] have mentioned the presence there of Mongolian-type lames and cores already noted some twelve years earlier by Nelson[3] and by Rainey.[4] In this connection, it may not be out of place to summarize the findings of Hitoshi Watanabe, a Japanese archaeologist, on the characteristics that distinguish a lame from an ordinary flake. Although the primary purpose of his research[5] was to clarify some misconceptions created in Japanese archaeology by somewhat indiscriminate application of the term lames to relatively long and narrow flakes, found in both the main island of Honshu and the northernmost island of Hokkaido, much of the data is relevant to Alaskan archaeology

Watanabe examined several collections of lithic material in the possession of the Department of Anthropology, Tokyo University, using a collection of 150 lames and 23 micronuclei from Linnsi in Jehol Province, North China, as his control group. The lames were 10-50 mm. long, 4-12 mm. wide, and 1-4 mm. thick. The width-thickness index averaged 28. The great majority of the nuclei were conical polyhedrons, the original material having been spalls or thick flakes of chert, agate, quartzite, etc. They were 15-38 mm. long and 7-25 mm. in diameter. At one end of each core was a flat striking platform with evidence that the lames had been flaked off in sequence from its circumference. The angle formed by the striking platform and the flake scar was approximately 90°.

Watanabe concluded that lames of the Mongolian type show these traits:

1. The lames were flaked from one definite direction.
2. The edges and ridges are straight and parallel.
3. The lames are relatively thin and the width-thickness index is relatively constant and within a narrow range.
4. The angle formed by the striking-platform and flake scar is approximately 90°.
5. Polyhedral cores are to be found in association with lames.

In keeping with the criteria listed above were the samples from Hokkaido: 4 obsidian flakes from Kitami Province and 18 obsidian flakes and a nucleus from the Ainu of the district of Obihiro. The specimens from Kitami were 35-44 mm. long, 12-16 mm. wide, and 3-4 mm. thick. The width-thickness index was 25. Though no nucleus was in the collection, it was accompanied by a photograph of one found in Kitami. The Obihiro lames were 10-39 mm. long, 4-7 mm. wide, and 1-3 mm. thick. The width-thickness index averaged 31.

The 96 flakes from Shinshu in Honshu were rejected as not being true lames. They were 20-51 mm. long, 7-18 mm. wide, and 1.5-10 mm. thick with an average width-thickness index of 46. The range and variability of the index was wide. The edges and ridges were curved or zigzag and not parallel. The angle formed by the striking-platform and flake scar was approximately 120° and the specimens showed a variability in the direction of flaking. No cores have been found in Honshu.

Watanabe points out that the distribution of the Mongolian type lames ranges from Sinkiang Province in China, through Mongolia, North Manchuria, Siberia, Hokkaido, Kamchatka, to Alaska (Dixthada and Fairbanks). He further points out that this distribution is restricted to north of 40° North Latitude.

FERDINAND E. OKADA
Columbia University
New York 27, New York
October, 1950

* Received just in time for this issue, Mr. Okada's paper comprises a useful footnote to Giddings article on pp. 193 ff.

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NOTES ON SOIL ANALYSIS AND ARCHAEOLOGY

With the addition of Carbon 14 dating to the archaeologist's repertory as a technique for determining the actual age of archaeological specimens, this phase of archaeology in America has been put on a more exact basis.

However, preoccupied as we seem to be with "dates," a method of chemical analysis useful in archaeology and evolved twenty years ago by Arrhenius (1930) and applied by Schnell (1932) in northern Europe has remained unnoticed in this country, although Clark (1936, pp. 19-22) mentions it. On the other hand, the importance of the subject of soil compositions and its relation to American archaeology is not a new one. Krieger (1940, pp. 127-128) stressed the need for such

a study. This method involves the determination of available bone phosphate by soil analysis; phosphate content indicates whether any given area has been occupied by intensive human settlement. It has been determined that the soil of an area of intensive occupation may contain easily as much as 50 times the proportion of phosphate as ordinary soil; the phosphates result from discarded and decayed bones. In short, this is a check on the available amount of osseous debris or bone fertilizer in the soil, and it follows that little available phosphate is found on sites not occupied by humans.

The unit by which the phosphate content has been standardized is a measure called a phosphate degree. It is equivalent to a yield of 1/1000 per cent of phosphate under the action of citric acid at a strength of 2 per cent. It is presumed that this phosphate check will yield valid results even in some of our heavily fertilized fields, since the analysis is a measure of relative phosphate content over a broad area. Naturally a systematic plan of sampling is made in order to ensure unqualified deductions.

Following the European studies, the writer determined to check the soil samples taken from a late Adena mound (46 Mr-2) at Natrium, West Virginia, during the winter of 1948-49. Of the 51 features uncovered in the mound, 20 yielded skeletal remains. In all cases, these remains were very poorly preserved. Indeed, all that remained of several burials were minor osseous fragments preserved by the copper salts from associated copper objects. It was suspected that many of the features lacking evidence of skeletal material were originally burials of which nothing remained save the accompanying artifacts. Accordingly, in order to find some basis for this speculation, the writer submitted 30 soil samples for a check on the available phosphate to the soil specialists at the Department of Agriculture, Washington, D. C. These samples were taken from features containing known burials, features from which skeletal remains were absent, various pockets of soil throughout the mound, and from the different levels of the mound from top to bottom. The sterile soil below the mound and the sterile soil outside the mound were also sampled. Included for testing, were samples of such earthy deposits as red and yellow ocher which frequently occurred as associated materials in the mound features.

The soil analyists using their own standards arbitrarily scaled the available phosphate content in 5 degrees of concentration, viz: very low, low, medium, high, and very high. In addition, the writer asked for the pH value (acidity or alkalinity) of the samples since it was presumed that acid mediums were factors accounting for the poor preservation of skeletal material in Natrium Mound. It was further thought that knowledge of the range of acidity might give clues as to why some osseous remains were more poorly preserved than others; it should be mentioned here that a solution with a pH of 4 is 10 times as acid as one with a pH of 5, and 100 times as acid as one with a pH of 6. The third and final check requested from the soil analysts was the identification and nomenclature of the textural quality of the soil samples. This was thought to be necessary for the standardization of descriptions.

The results of these analyses, especially the phosphate analysis, were highly enlightening. The tests for available phosphate showed that the sampled features lacking in actual skeletal material indicated a very high phosphate content. This showed that bones had been present but had disintegrated. Hence, we may presume that there were originally more burials in the mound than were recovered in excavation, although we cannot be certain whether the origin of the bone phosphate was human or non-human. In this connection we infer that such material objects as were found in the features accompanied human remains which had long since decayed. Cremation ashes were, of course, very high in available phosphate. There was also a loose powdery gray soil resembling hearth sweepings which capped several features in the Natrium Mound. This soil contained a very high proportion of phosphate. These deposits are interpreted as evidence that these gray soils resulted from crematory practices. As one might expect, a prepared basal layer of yellow loam and the sterile subsoil of the mound were respectively, "low" and "very low" in available phosphate. The loam reading of "low" may indicate that some of the bone phosphate from the burials had percolated to the prepared loam hardpan base which acted as an almost impervious seal. A sample taken from the soil outside the mound proper also yielded a "very low" amount of available phosphate. As a control sample it indicated that the distribution of bone phosphate was neither accidental nor haphazard in occurrence.

A peculiarity of red ocher, of which about 18 pounds were found, was discovered in the course of the investigation. The red ocher was very high in available phosphate, which was surprising, especially since natural red ocher is lacking in phosphate. One might suggest that the red ocher was contaminated by its association with burials. However, this was not likely since other colored earth samples found in the same features did not show a correspondingly very high phosphate content. There is the vague possibility that the red ocher was in direct contact with skeletal material which had since deteriorated. This problem of red ocher containing phosphates should be further investigated.

No similar significant differences were observed for the pH values, although these ranged from pH 4.3 to pH 6.4. The average was closer to the lower numerical scale value, or higher acidity. The soil outside the mound was less acid than the average acidity of the soil within the mound. It is possible that this was a fault of the sampling. However, it is obvious that since the mound fill was heavily contaminated with deposits of human origin, some differences in acidity might be expected. Unquestionably, the relatively high acidity of the mound fill accounted for the extremely poor preservation of the skeletal remains. Were this a shell mound (an alkaline medium), archaeological remains of comparable age would probably have been considerably less deteriorated.

In conclusion, the writer wishes to bring to attention an aspect of soil chemistry which should be considered by field workers, or at least alert them to its possibilities. The test for available phosphate, the more important of the two analyses outlined here, shows whether osseous matter was present or not. The determination of available bone phosphate is important, particularly in those situations where burials are suggested by other evidence but actual skeletal evidence is lacking. One can also easily foresee the possibilities of testing for intensively settled archaeological sites in a quick survey over a wide area. A small soil sample, enough for a test tube analysis, is sufficient for the laboratory.

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RALPH S. SOLECKI
River Basin Surveys
Smithsonian Institution
Washington, D.C.
June, 1950

WHISTLES FROM ARIZONA

The two specimens here illustrated (Fig. 83) were found in 1925 by E. H. Morris and the writer in a cave opposite and a little above the White House, Canyon de Chelly, Arizona. They lay together about 50 cm. deep in loose sand. They are doubtless Anasazi, but as no other artifacts were found in association it is uncertain whether they are of Basket Maker or Pueblo manufacture. Made from bird bones, apparently ulnae of a large species, they are of identical workmanship, the ends cut squarely across, the shafts polished as if from long handling. The ends of each one's single oval perforation are sharply edged. Directly below the perforation is a little mound of a dark brown, gummy substance, troughed lengthwise (Fig. 84). This throws trough-canalized air, blown from either end, up against the sharp edge at the opposite end of the perforation, producing a shrill whistling note. The photograph is about natural size, the specimens being 11.6 and 12.4 cm. long. The drawing shows longitudinal section and transverse section at the middle of the perforation, the gummy substance indicated by hachure.

A. V. KIDDER
Carnegie Institution of Washington
August, 1950

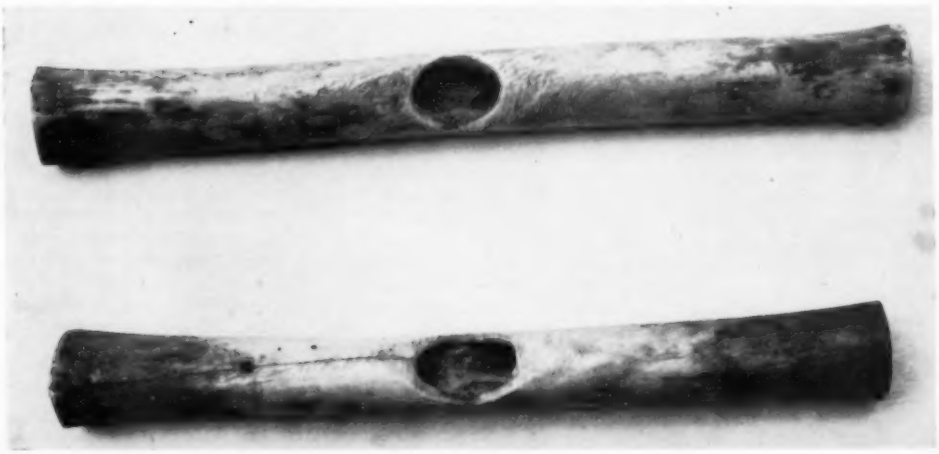

FIG. 83. Bird bone whistles.

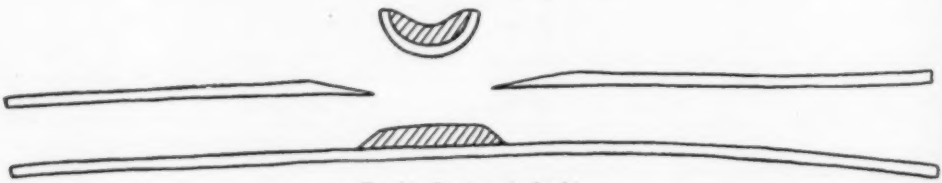

FIG. 84. Section of whistles.

A BALL COURT LOCATED ON THE SAN PEDRO RIVER IN SOUTHEASTERN ARIZONA

The Amerind Foundation, Inc. spent the first three weeks of December, 1948, excavating a ball court at the archaeological site of Arizona:BB:15:3, which is located in Cochise County, Sec. 20, T15S, R20E. The actual village area is located on the west bank of the San Pedro River twenty-two miles north of the city of Benson at an approximate elevation of 3300 feet.

The ball court was located in the north half of the village on a terrace some forty feet above the river channel. It appeared as a shallow but conspicuous oval depression which was overgrown with mesquite trees and other desert flora of the Sonoran plateau type. Fortunately the court had not been disturbed by any previous excavations nor by erosion (Fig. 86, *a*). The highest point on the lip of the depression was approximately three feet above the lowest point in the center of the court and one foot above the surrounding ground level. The over-all depression measured approximately one hundred and ten feet in length and sixty feet in width.

The longitudinal axis (N-S) including both entrances and goals was oriented two degrees west of true north. Along this axis a trench one yard in width was cut the full length of the court. The short axis (E-W) trench was sunk centrally across the span of the court through the walls into the outer native sterile soils. The four control trenches were then connected by trenches of similar width which ran along the inside edge of the court until all four points of the control trenches were connected by a large oval shaped cut. The two entrance areas and three goal areas were completely stripped.

The court measured 86.5 feet along the longitudinal axis (N-S) and 44.2 feet along the short (E-W) axis. The side walls of the court measured 2 feet above the playing floor level. The present height of the bordering walls and the amount of fill from collapsed walls indicate that the walls originally attained the probable height of 3 or 4 feet. There was no indication that, at any time, did they reach the 5 or 6 meter height Haury postulates for the larger and earlier type Snaketown court (Gladwin et al., 1937, I, p. 39; Fig. 2). The poorly defined wall bases sloped down from the outside

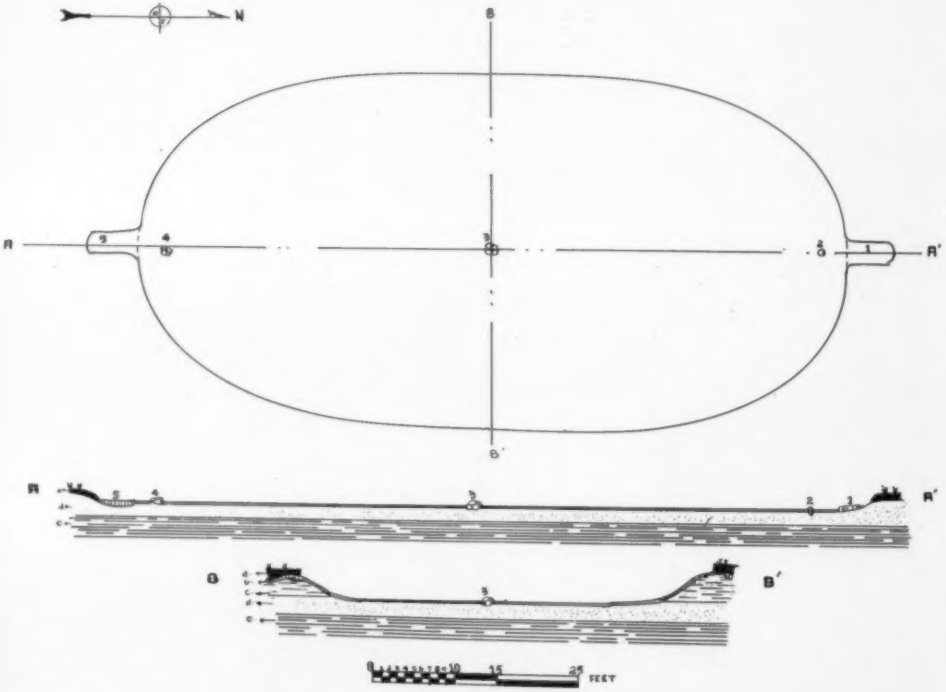

FIG. 85. Arizona:BB:15:3 ball court. *1*, north entrance; *2*, north end goal; *3*, central goal; *4*, south end goal; *5*, south entrance; *a*, top soil (fill); *b*, red clay stratum (used on wall interiors and entrance floors); *c*, coarse sand and gravel (wall core); *d*, coarse sand and gravel (sterile); *e*, caliche undisturbed; *A-A'*, longitudinal axis (N-S); *B-B'*, short axis (E-W).

sterile zone into the court interior. This base consisted of a stratum of coarse gravel and sand which apparently had been scraped up from the central section of the court when the court floor was originally leveled. The E-W control trench exposed a wall base of gravel approximately 3 feet thick which was covered by a red clay stratum 3 to 9 inches thick. This soil was brought in to complete and smooth the interior walls of the playing area but was not a recognized hard plaster as is occasionally found on the walls of other courts such as the one described by Tuthill at Tres Alamos (Tuthill, 1947, p. 39). This red clay stratum was covered with a stratum of black trash material which contained sherds and which varied in thickness from eight inches along the wall summit to two and a half feet in the depressed center of the court.

The floor, one of the most unusual features of the court, did not consist of the usual hardpacked clay found in other courts, but rather of a thin stratum of fine, clean, dark colored sand approximately 0.4 of a foot in thickness which was laid down over a stratum of white sterile sand approximately 1.2 feet in thickness. A hard sterile bed of caliche was encountered under the white sand stratum. It has been suggested that the unusual floor feature indicated that the court was never completed or that it was a characteristic trait peculiar to this particular village. The floor was amazingly level as the longitudial axis (N-S) showed a very slight variation in level of only 0.1 of a foot in its entire length. In cross-section the short axis (E-W) resembled a shallow dish being level in the central section for a distance

FIG. 86. Arizona:BB:15:3 ball court and goal markers. *a*, general view of the ball court depression looking north (the three figures mark the short axis of the ball court); *b*, north goal marker (wooden post); *c*, central goal marker; *d*, south goal marker.

of 34 feet and rising 0.6 of a foot for 5 feet to wall contact from the center. (Fig. 85, cross-section *B-B'*).

Three goals were located on the floor proper along the long (N-S) axis. The north end goal was centrally located approximately 3 feet in from the inner edge of the north entrance. The north goal consisted of a charred post of mountain oak 4.1 inches in diameter, 18 inches long and exposed 6.2 inches above the playing floor. (Fig. 86, *b*). The second goal was located in the center of the court. This marker consisted of a group of seven unworked stones. Four of these were set into the sandy floor approximately 0.5 of a foot and protruded 7.2 inches above the floor. The four base stones measured 1.4 feet in diameter. Three other loose stones were laid on top of the stone base and completed the central marker (Fig. 86, *c*). The third marker was located at the south end of the court approximately 3.2 feet in from the inside edge of the south entrance. This marker consisted of four stones set into the floor approximately 4 inches and protruding above the floor 8 inches. The south marker measured 1.3 feet in diameter (Fig. 86, *d*).

The two entrances were centrally located at each end of the court. They measured 6 feet in length and 3 feet in width. The floors, elevated 6 inches above the sandy playing floor of the court, were made of hardpacked red clay similar to that used on the wall interiors.

According to Haury's classification (Gladwin, et al., 1937, I, pp. 36-49) the Arizona:BB:15:3 court was of the later Casa Grande type. This was verified by the sherds found in association with the village. The characteristic traits of this particular type of court were its small size, orientation along a north-south axis, oval shape, two entrances located on the north and the south ends of the court, low sloping walls, and three floor features defined as goal markers located in the north, central, and south areas of the playing floor.

The Casa Grande type court has been found at Snaketown, Casa Grande, Adamsville and in the Salt River Valley, in southern Arizona (Gladwin et al., 1937, pp. 36-43). Further to the north two similar courts have been located in the Verde Valley near the mouth of Clear Creek, while eight have been located in the Flagstaff area (Colton, 1939, p. 50 and Mindeleff, 1896, pp. 244-246). These courts appear to represent the northern limits of the Hohokam influence.

Sayles reports the presence of a Casa Grande type court near Cave Creek in southeastern Arizona (Sayles, 1945, pp. 31-32). He places the Cave Creek court in the Encinas phase of the San Simon branch of the Mogollon Culture. Assuming that the court suggested strong Hohokam influence we can extend the Hohokam contact area to the San Simon Valley in the southeastern section of Arizona.

Seven and one-half miles to the south of the Arizona: BB:15:3 court Tuthill excavated a court at the site of Tres Alamos (Tuthill, 1947, pp. 38-43), a village also located on the San Pedro River. He suggests that the Tres Alamos court was a hybrid form as it contained features of both the Snaketown and the later Casa Grande type ball court. However he does suggest that though a hybrid the Tres Alamos court was basically a Casa Grande type court. The Tres Alamos court may have been built either during the Tres Alamos phase or during the closing years of the Cascabel phase, which would place the court somewhere between the dates of 900 to 1100 A.D. To the south of the Tres Alamos ruin other large ruins of similar time span and culture extend down through Saint David, Contention City, and as far as Fairbank, Arizona. This suggests a strong Hohokam contact area for most of the San Pedro River valley area.

For the present it may be assumed that the Arizona: BB:15:3 court falls into the late Hohokam classification and that there was a strong contact between the Hohokam of the Gila Salt drainage and the San Pedro valley dwellers.

A number of interesting speculations have been made concerning the possible usages of the ball court in Arizona (Chard, 1940, pp. 9-14; Gladwin et al., 1937, I, pp. 36-49; Tuthill, 1947, pp. 38-43). It has been suggested that a game similar to the Maya game of *pok-ta-pok* was played on the earlier Snaketown type court; whereas the smaller Casa Grande type court could accommodate a kind of "shinny" game. Chard (1940, p. 14) suggests that these are shinny courts. Many present day Indian tribes in the area still do or did, until recently, play a shinny game and the game was often played on an area having three markers placed similarly to those found in the Casa Grande type court. Tuthill (1947, p. 41) suggests a still different game for the Tres Alamos court where he discovered sixty-nine stone paddles in association with the court area. He suggests that a game could have been played wherein stone hand paddles were employed in batting a ball. No stone paddles were found at the Arizona:BB:15:3 court to strengthen Tuthill's suggestion.

The locating and reporting of a ball court on the banks of the San Pedro River is not, by any means, spectacular news inasmuch as similar Casa Grande type courts have been located to the south, east, and north of the above mentioned village. However, the discovery of this court offers further proof of strong Hohokam influence extending into the San Pedro Valley during prehistoric times.

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CHARLES C. DIPESO
Amerind Foundation, Inc.
Dragoon, Arizona
August, 1950

FLUTED POINTS IN ONTARIO

Up to the present no fluted points have been discovered in Ontario. A small number having some affinities to the type have been found in various parts of the Province, but none has come to light under conditions of controlled excavation. It is with a view to making available what information there is concerning those we have that this note is submitted and the illustrations published. The originals of all those shown, in addition to three not illustrated, are in the collections of the Royal Ontario Museum of Archaeology at Toronto.

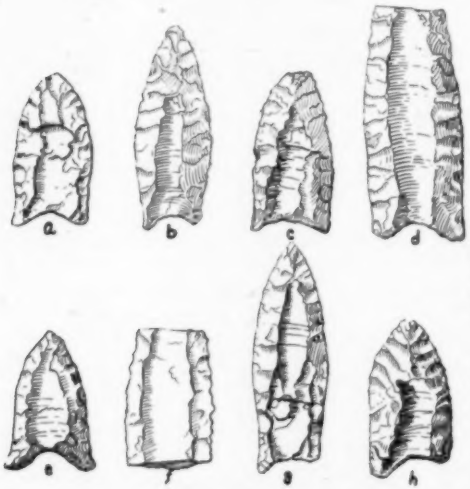

FIG. 87. Fluted projectile points in the Royal Ontario Museum of Archaeology. *a*, Brant County; *b*, Elgin County; *c*, Elmsley township, Lanark County; *d*, McGillivray township, Middlesex County; *e*, probably Adelaide township, Middlesex County; *f*, probably McGillivray township, Middlesex County; *g*, probably Biddulph township, Middlesex County; *h*, Simcoe or the northern part of York County. About one half size.

It will be noted from the captions that such artifacts have been reported fairly widely distributed from the county of Elgin at the extreme southwestern limits of the Province to Lanark County in the east. The majority, however, have been found in the central and southwestern counties. The points in the Royal Ontario Museum of Archaeology which are not illustrated come respectively from Rideau Lake in Lanark County, Ameliasburg township, Prince Edward county, and from the shore of Rice Lake, Hamilton township, Northumberland county. The latter specimen more closely approaches the Folsom Fluted type than do most of the others, possessing as it does a slender blade, with a well-made channel on both faces.

A few other specimens are said to be in a private collection which the writer has not seen, but appear not to be fully documented. They are reported to have been found in southwestern Ontario. Possibly a small number of others also exist in private collections in the same part of Ontario.

Meager and unsatisfactory as these data are, they do indicate the presence in Ontario of fluted points bearing some resemblance to the Folsom Fluted type and that the distribution of these specimens seems to have its local center in southwestern Ontario.

KENNETH E. KIDD
Royal Ontario Museum
Toronto, Ontario

GENUINE LOST COLOR

This is written as a warning to archaeological field workers whose excavations may yield pottery decorated by the resist-painted technique. Such a technique, often called negative painting, consists of painting a design on a slipped vessel in some substance, presumably hot wax, that is resistant to paint. The vessel is then painted over in another color, or smoked. The resistant substance is removed, and the design stands out light against a dark background.

In March-April of 1941 I excavated two urn burial plots in the streets of Nebaj, in western Quiché, Guatemala. About a dozen of the 235 vessels recovered were in an orange resist-painted ware. The negative design was apparently achieved by smoking a resist-painted cream-slipped vessel. The vessel was then covered by a thin wash of orange and decorated by darker orange stripes, usually a narrow horizontal one below the rim, and three or four panels of vertical ones below that. It was then polished. The negative designs are usually geometric, and crudely done, as are the final red lines.

Fig. 88 *a* and *b* show the condition of one of these vessels (Catalogue No. 49-4-77, University Museum, Phila.) two months after excavation. Fig. 88, *a* is a photograph of the watercolor painted by Sr. D. Antonio Tejeda.

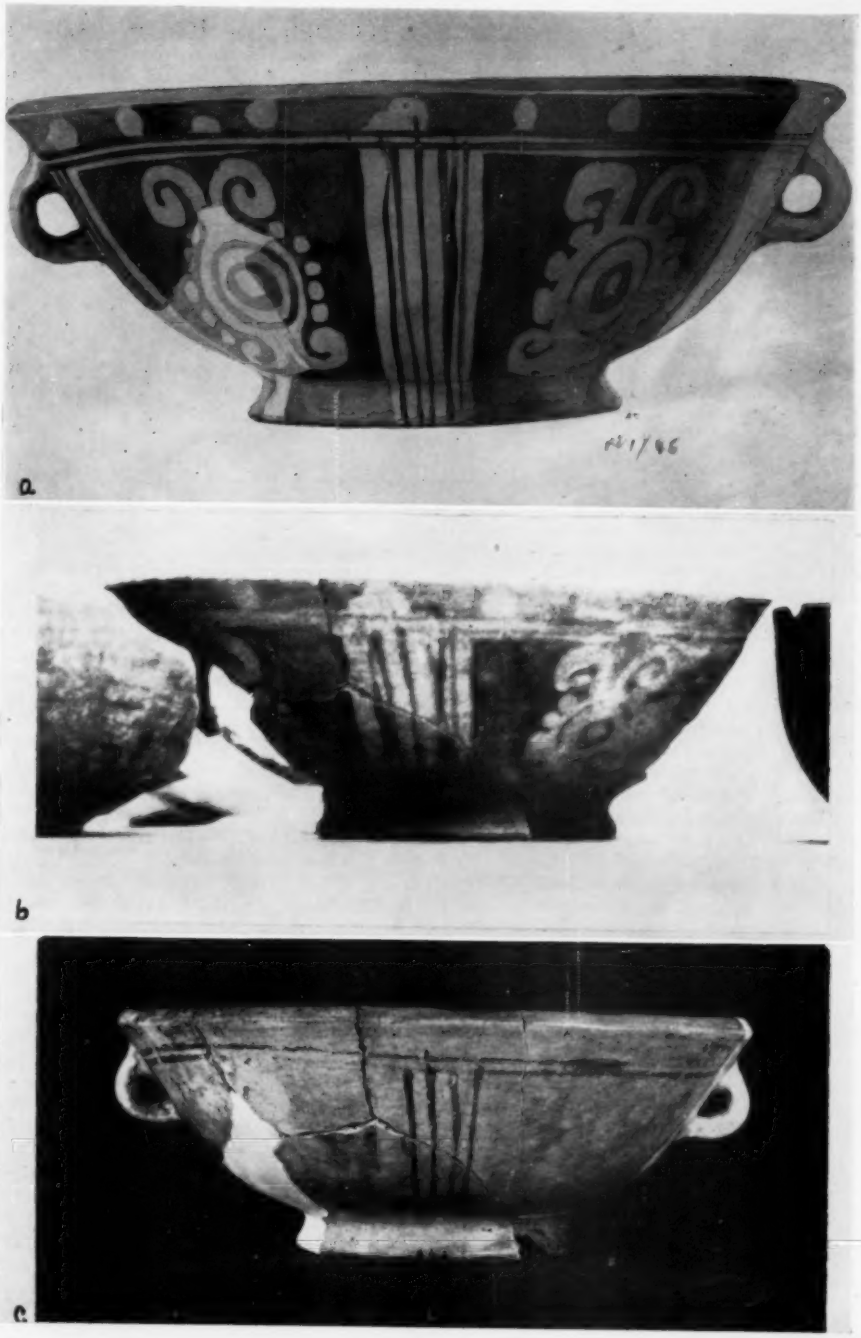

FIG. 88

of the Carnegie Institution of Washington in Guatemala City in June 1941; Fig. 88, *b* a black-and-white copy of a Kodachrome taken in the same place at the same time. A black-and-white photograph of the bowl, also taken then, shows the same design as the other two pictures. Incidentally, although these pictures give a true record of the design visible in 1941, they give a false impression of the appearance of the vessel. In the photographs the black of the underlying resist-painted design completely absorbs the orange secondary coat which is the first thing to catch the eye on the actual vessel.

Fig. 88, *c* shows the bowl at the present time. It has never, so far as I know, been exposed to direct sunlight since excavation, and from July 1941 to the spring of 1949 was wrapped in newspaper inside a closed packing-box in the Carnegie offices in Guatemala City, prior to shipment by sea to Philadelphia.

When the Nebaj material at the University Museum was catalogued in May 1949 we found that a number of vesesls no longer showed clearly the designs drawn for them in my 1941 notes. Such notes, accurate though I might think them to be, were not actual proof that the designs had ever existed. I was therefore very much pleased to find that for one of the vessels now in Philadelphia I had not only a black-and-white photograph, but a Kodachrome and a watercolor.

I felt that the point to be determined was whether any of the original black-and-white design was latent if not apparent, and could be brought out either by a bath or photography.

The bowl was first, through the kindness of Mr. Henri Marceau of the Philadelphia Museum of Art, put under an ultra-violet lamp with a Woods filter, to bring out any mineral pigment remaining but not visible. There was no relevant reaction. Without result it was soaked for hours in water, and washed with tetrachloride.

Photography revealed no more than the naked eye. Mr. Reuben Goldberg, the University Museum photographer, said that infra-red photography, the only thing we thought of and didn't try, would with this vessel show up no more than the black-and-white had done.

This experience with Nebaj resist-painted vessels explained an earlier one with a resist-painted cream ware tripod bowl with animal-head feet (U. M. Cat. No. 41-36-4) found in an as yet unpublished plumbate understair burial at Chamá, Alta Verapaz, Guatemala. The black background to the self-slip design recorded for this bowl in Guatemala before it was shipped to Philadelphia in 1940 had completely vanished a year or two later. I had blamed this on over-zealous cleaning by the man who restored the vessel, but there seems little doubt that it suffered the same fate as those from Nebaj.

The resist-painting discussed here is a specialized kind, presumably using carbon instead of paint for its black background. It is however a decoration frequently used on fine pottery in the Chixoy area of highland Guatemala and known elsewhere. The disappearances here reported suggest that it may have been more widely used, both alone and combined with other forms of painting, than we now know, and that the evidence has literally vanished before our eyes. At all events, this Case of the Vanishing Design seems to point to the wisdom of recording any decoration that may include resist-painted elements just as soon as possible after excavation.

MARY BUTLER
University Museum,
Philadelphia, Pa.
June, 1950

ON THE INTERPRETATION OF FAUNAL REMAINS

There is little doubt that the archaeologist in marginal areas who attempts to interpret his finds may be led to false conclusions if he accepts at face value statements concerning ranges of species whose remains he discovers in village refuse. He should remember that in nature living beings are not subject to marshalling behind sharply defined limits, but will almost inevitably be found outside the accepted "range," either because of migration or isolated occurrence which has not been recorded.

As a case in point, take the hard shell clam, or quahog (*Venus mercenaria* Linné). *Venus* is common south of Cape Cod, and is understood to be more commonly found in warmer water, while the soft-shelled clam (*Mya arenaria* Linné) is the common clam in the colder waters north of Cape Cod. Charles W. Johnson (*Fauna of New England, 13, List of the Mollusca*, Occasional Papers of the Boston Society of Natural History, VII, Boston, 1915) lists an occurrence of *Venus* in "Quahog Bay, in Casco Bay," near Portland, Maine, and for "Massachusetts, Revere, Provincetown, common south of Cape Cod." The species is common along the entire coast of Connecticut.

Blue Hill Bay, in Hancock County, lies east of the Penobscot River. Sites on its shores have been one of my major interests over the past ten years. Shells of *Venus* found in shellheaps in that vicinity have led us to conjecture that there has been a change in water temperature or in the distribution of the species. However, during the last year I have found and occasionally enjoyed a meal of quahogs taken from one of three colonies of *Venus* that are to be found in the arms of the Bay. There are also areas in other bays on the shore of Hancock County where this clam is found. Thus it is evident that the species now has discontinuous distribution well to the north and east of its area of continuous distribution. If we may judge from remains in shellheaps, it is quite probable that the species has enjoyed such a distribution for a considerable period of time. Should such prove to be the case, finds of the shells of *Venus* in shellheaps would not necessarily indicate a difference in temperature of the water.

There is some possibility of confusion with *Cyprina islandica* (Linné), the black quahog, but differences in the shape of the shell may be noted. Furthermore, *Cyprina* is found in deeper water, and it is therefore less likely that individuals of this species would be picked up by Indians, except as storm-tossed rarities.

Doubtless this word of caution will be of value to all who encounter representatives of unusual species among the faunal or floral remains found at a site.

Douglas S. Byers
R. S. Peabody Foundation
Andover, Massachusetts

FRASER RIVER DELTA ARCHAEOLOGICAL FINDINGS

Our findings to date indicate that the archaeology of the Fraser Delta region is far more complicated than Harlan I. Smith or even Philip Drucker anticipated. Every major site investigated so far has a distinctive character. At some of them culture sequences are clearly apparent.

Harpoon points are being recognized as important diagnostic elements. Three main classes can be distinguished: 1, barbed harpoons with tang (Pt. Grey, Marpole); 2, one-piece toggles (Locarno Beach); 3, two-piece toggles (Whalen, Musqueam). Two-piece toggles are present at sites with historic (Musqueam) and proto-historic (Whalen) horizons, but conspicuously absent at sites where very old (500+ years) coniferous trees grow on the deposits (Pt. Grey, Marpole, and probably Locarno Beach).

The one-piece (Locarno Beach II) and early two-piece (Whalen I) toggles appear to be part of a culture pattern in which the grinding of slate (for knives, arrow and lance heads) was of major importance; chipping is reduced to a minor role. Heavy-duty woodworking tools are significantly absent. Sea-mammal hunting with toggle heads, ground slate projectile points, ulo-like slate knives, elliptical medial labrets, and other elements suggest a culture which closely resembled early far northern cultures.

Other Fraser Delta cultures are characterized by the presence of splitting wedges, heavy pounding hammers, and numerous large and small adze-blades, implements suggesting the existence of an advanced woodworking industry (plank houses, dugout canoes, wood carving, etc.). The advanced woodworking complex seems to have evolved among groups that had strong ties with the interior plateau.

At Marpole (because of inadequate work the situation is not clear here) and at Pt. Grey woodworking seems to be associated with the use of barbed harpoons with tang. In Whalen II woodworking implements appear together with two-piece toggles. Emphasis on chipping and complete lack of ground slate in Whalen II may suggest recent arrival of this group from the interior. At Musqueam and other sites with historic horizons woodworking, fishing and sea-mammal hunting with two-piece toggles and the slate grinding industry are found together, forming characteristic components of the historic culture pattern of most of the Gulf of Georgia Salish groups.

Charles E. Borden
University of British Columbia
August 1950

SNAKETOWN IV VS. THE FACTS

In 1937 Gila Pueblo reported on its excavations at Snaketown, a large Hohokam site in southern Arizona, in which a time range from 300 B.C. to 1100 A.D. was assigned (Gladwin, et al, 1937). Gladwin (1942) then presented a revision, based on his own comparative tree-ring research, in which he raised the beginning date for the site up to 600 A.D. In his latest publication Gladwin (1948) brings a second revision in which additional time and cultural alterations are offered. These are again based on his own dendrochronological studies. These results he correlates in turn, on a broad scale, with the Mogollon development.

The reviews to date of Gladwin's latest scheme have been concerned either with general aspects (Woodward, 1950) or with the statistical validation of the sequence of Hohokam phases as originally established at Snaketown (Lehmer, 1950). Other points of importance also call for discussion.

Gladwin's last approach to the problem is restricted in that only the material from Mound 29, one feature of the site of Snaketown, is considered. In working with this material he proceeds by giving equal correlative value to all pottery types associated in each artificial block removed from this trashmound. For example, in Figure 9 he lists one sherd of Kiatuthlanna Black-on-white found in a section containing 440 plain sherds, 298 Santa Cruz Red-on-buff sherds, 3 Gila Butte Red-on-buff and 1 Snaketown Red-on-buff. In the original report, Haury assigned this block to the Santa Cruz phase. In his 1948 discussion, however, Gladwin considers this a valid association also for Gila Butte and Snaketown Red-on-buff due to the presence of 3 and 1 sherds respectively. He continues his analysis on this basis of association and completely disregards the depositional growth of the mound, which in most instances explains the presence of two and three phase associations on planes of contact. Gladwin states (1948, p. 34) that he did not make any changes in Haury's original identifications or counts, even though in the above example, the Kiatuthlanna Black-on-white mentioned cannot be found in the original report. In another case (p. 19) he reproduces Haury's chart of intrusives which lists Deadmans Black-on-red occurring in the Santa Cruz and Sacaton phases. However, in his discussion and summary of these two phases (pp. 14 and 16), Gladwin lists Tusayan Black-on-red and not Deadmans Black-on-red. Considering this type (a recognized Pueblo II type) he states "This type of black-on-red . . . has also been found around Flagstaff by Colton, where it is known as Deadmans Black-on-red" (p. 94).

Here we have two recognized pottery types which Gladwin confuses as one and the same. On the basis of this misconception he tries to explain the association of Tusayan Black-on-red with Black Mesa Black-on-white stating "Tusayan Black-on-red loses some of its dating value by dropping down into Pueblo I." Haury's correct original listing of Deadmans Black-on-red does fall into the range of the Pueblo I category and is in correct association with Black Mesa Black-on-white. Had Gladwin realized that these were two different types, this confusion would not have arisen.

In considering another intrusive, Gladwin discusses Black Mesa Black-on-white (1948, pp. 90-91), and is particularly concerned over the fact that it occurs in pit houses in the Flagstaff area as well as in masonry ruins as far east as Chaco. The significant point he overlooks is the fact that this type is also an intrusive in the Flagstaff area. Nor did he consider the fact that surface pueblos appeared early in the east and did not appear in the Flagstaff area until about 1120 A.D., as Colton has demonstrated. In an effort to lower the date for the appearance of masonry dwellings in the Flagstaff area, and in contrast to his expressed idea that archaeological evidence should be considered along with treering dates, Gladwin refers to one of several dates, 1073 A.D., published for Wupatki, a masonry ruin. In 1946 Colton assigned 1120-1130 A.D. as the beginning date for Wupatki, pointing out that dates ranged from 1073 to 1205 A.D. and that only 9 out of 49 beams dated prior to 1120 A.D. of which only one was a bark date. Concerning this latter Colton remarked on the possibilities of a reused beam or the use of a timber dead some years prior to construction use. Pottery associations bore out the 1120 A.D. date. This is one of several examples wherein Gladwin selects evidence to support his attempt to lower Pueblo dating, much of which is in the nature of a chain reaction stemming from his confusion pertaining to Tusayan and Deadmans Black-on-red.

In treating with the general subject of intrusive pottery, he brings up the factors of distance and time pertaining to trade and suggests 50 years "from the cradle to the grave" (p. 108). Indian trade and movement as encountered by the Spanish during their early period of exploration as well as their own movements on foot offer opposing evidence. In 1535-1536, Cabeza de Vaca took 8 months to travel from Texas to Sonora, making intermittent stops along the way. Fray Marcos de Niza left Culiacan in March 1539, walked to Zuni (or at least to Arizona), and by September was back in Mexico City. In 1540 Alarcon was told by Indians on the lower Colorado River that Zuni was 30 days distant. In 1604 the Yavapai in the Verde Valley of central Arizona informed Oñate that it was 20 days travel to the sea. The exploits of the Mohave in traveling to the coast to barter for sea shells are well documented.

On the other extreme, Gladwin (1948, p. 107) cites a piece of White Mound Black-on-white found in the fill of a house dating 898 A.D. at the Mogollon Village. He asks why it took 100 years to travel 120 miles. Bandelier, Whipple and others have recorded prehistoric pottery in modern pueblos in the late 1800's. Barber recorded similar practices among the Navaho. Roberts has suggested that such survivals result from the activities of "antique devotees." There is also the human element to consider. A collapsed pit house could have been used as a handy pit for disposal of trash, may have been filled with material taken out of the ground in the process of excavating a new pit house, or may have been purposefully filled to remove a hazard. Repeated occurrences and an abundance of associations of intrusives can be relied upon, but isolated examples such as the above should be treated with caution.

Gladwin questions Haury's implication that the Hohokam had pottery before the Anasazi, to account for the lack of Basket Maker III sherds in the Pioneer period. He suggests the other extreme, that Snaketown was founded after Basket Maker III pottery passed out of use. In the development of this problem, neither Gladwin nor Haury considered the results of Gila Pueblo's survey in the Verde Valley several years prior to the Snaketown excavations. An analysis of the material listed from Verde Valley sites indicates that the Hohokam were just beginning to enter the area at 700 A.D., moving north toward the Sinagua of the Flagstaff region. Northern intrusives in this valley dating between 700 and 900 A.D. are scarce. Not until about 900 A.D. do they appear in quantity in either the Verde Valley, the Salt River Valley, or in the Snaketown area. In short, before 700 A.D. there was no middleman to carry on trade between the Sinagua or Anasazi and the Hohokam, with the possible exception of the Mogollon groups extending along the Arizona-New Mexico line. Human relations demand more consideration than a potsherd away from home if we are to interpret prehistory.

It is evident that there is some disagreement between Gladwin's list of house types and that of Sayles' in the original report (Gladwin, *et al*, 1937). Compare pp. 112-115 (1948) with the original report, p. 59, Fig. 19, pp. 75 and 77, and Pl. XX and XXIII (1937). Note particularly the phase assignment of both in reference to block 8:F. In spite of this confusion, reanalysis favors Gladwin's house chronology, but not a contemporaneity of the early and middle types. In fact, if house 7 in 6:F, which Sayles placed in the Sacaton or Santa Cruz phase, is removed from Gladwin's listing in the Sweetwater phase, the correlation of house types is even more remarkable among the first three phases.

On the basis of his latest selective reanalysis and correlations, some examples of which are cited above, Gladwin places the Pioneer period phases (pre-500 A.D. in the 1937 report) on the same chronological plane with the Santa Cruz phase and a portion of the Sacaton phase (about 700 to 1000 A.D. in the 1937 report), and in addition discards the Gila Butte phase completely. These conclusions are based on the associations of pottery types of various phases within artificial blocks to which he has assigned contemporaneity. Gladwin discards the Gila Butte phase because the diagnostic pottery

type, Gila Butte Red-on-buff, occurred in all levels, which he interprets as being valid associations rather than a mixture on planes of contact resulting from mound growth. With the same reasoning he places the Pioneer period phases on an equal time footing with the Santa Cruz and Sacaton phases, on the basis of occasional association of Pioneer period pottery types with later material.

The present writer prepared a report (Schroeder, 1940) on the results of a stratigraphic survey in the vicinity of Phoenix, Arizona, in which "the first problem was to determine whether the chronology established at Snaketown by Gila Pueblo would hold in the Salt River Valley." Out of 16 trashmounds tested 7 were assigned to the Santa Cruz and Sacaton phases with the following sherd counts:

Phase	*Gila Butte*	*Santa Cruz*	*Sacaton*	*Soho*
		2613	2129	
	2	63	1593	2
		16	104	1
		414	3240	
		135	1834	
		168	1992	
		275	2592	1

Out of 17,174 sherds recovered, only 2 were Gila Butte Red-on-buff, scarcely making the type a normal accompaniment of later Hohokam painted pottery instead of a separate phase. In addition the lack of any Pioneer period sherds with this material gives no support to Gladwin's postulation that Pioneer period sites were contemporaneous with the Santa Cruz and Sacaton phases. In fact, the phase material and diagnostics, as set up by Gila Pueblo in the original report, occur in purer form in the Salt River Valley than in Mound 29 at Snaketown, which in itself is a tribute to the research conducted by the staff of Gila Pueblo up to 1937.

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ALBERT H. SCHROEDER
National Park Service
Boulder City, Nevada
August, 1950

STEPHENSON'S "CULTURE CHRONOLOGY IN TEXAS" [1]

When a synthesis such as Stephenson's appears, those concerned with it had better speak up, lest silence be mistaken for approval. Synthesis can only be helpful to the rest of the profession if done as accurately as available information permits. "Culture Chronology in Texas" is not entirely accurate. A line-for-line criticism of this article would require a good deal of explanation and documentation; hence I will confine my remarks to what seem to me the principal faults — those which may mislead those not well acquainted with Texas archaeology.

First, Stephenson divides Texas into "five generalized regions based on both cultural and physiographic factors." This is his own partitioning; others can distinguish as many as 10 or 15 divisions, with just as much reason. More important, he has used the expression "Balcones" phase, coined by J. Charles Kelley, as though it applied to the entire state, embracing anything and everything later than "the early, lithic horizon," but earlier than agriculture. I feel sure that Kelley himself had no intention of extending the Balcones phase (of the Archaic pattern) beyond certain archaeological complexes in central and western Texas, and perhaps reaching into the central part of the Gulf coast of Texas. Balcones phase can *not* be used as a synonym for all Archaic material in Texas. I strongly deny that there is any Balcones phase in what Stephenson calls the Northeastern Region, the Panhandle-Plains Region, or the eastern and southern portions of the Gulf coast. While much of the pre-ceramic material in these regions may be loosely called Archaic, it differs in these various areas and can be easily distinguished from the Balcones phase as Kelley conceived this term. Stephenson further says that in the southern part of the Panhandle and northern plains of Texas, there are "many individual sites that generally fit into the description of the [Balcones] phase in other parts of Texas." As one of those who has worked in these areas for a number of years, I am curious to know where these sites are and who has recognized them as such.

Second, it is very misleading to give such positive dates all through the article, as Stephenson does, leaving out all the alternatives presented by those who have done the actual work. Those of us who have labored long on these dating problems have generally not been foolish enough to insist on any of these dates, and have plainly said so. There have been estimates, suggestions, reasonings, and alternatives; but aside from extreme western Texas and the Canadian River valley, where Puebloan trade pottery gives the best clues to culture dates, our ideas have simply been the best we could offer from time to time. What is the value in this synthesis, then, if it is to be so arbitrary?

The table (Fig. 50) contains three principal datelines in all five columns: "arbitrary end of early, lithic, hunting horizon over North America"; "end of Balcones

[1] *American Antiquity*, Vol. 16, No. 2, pp. 151-7, 1950.

phase"; and "European contact." Regarding the first, I doubt that anyone can yet advance a date for the end of early hunting cultures, even provided that "early" can be defined. The same line is, moreover, used to denote the beginning of the Balcones phase, so that Stephenson would like to begin the Maravillas, Round Rock, and Clear Fork Foci at 3,000 B.C. even though the originator of these concepts did not do so. Kelley has indicated clearly enough the complexities of dating the terraces which contain these materials, and shown good reasons for beginning the deposition of these fills at about 2,000 B.C. In no case do the artifacts occur all the way to the terrace bases, and therefore the cultural material of these foci may not begin until even later.

Figure 50 shows a different position for "end of Balcones phase" in each of the five columns. Although he implies that this phase ends when agriculture begins (p. 152), there was never any native agriculture in much of Texas. The lines may therefore represent appearance of pottery or small, light projectile points (or both) in some cases, but this is not explained. In column 1, this line at about 1200 A.D. is probably reliable for the appearance of agriculture. In columns 2, 3, and 4 it may serve as a general indicator for appearance of datable trade pottery, but it is not shown that the cultures which received this pottery may have been in existence for a long time before trade began. In column 5, a beginning date of about 500 A.D. for the Alto focus was one of my suggestions, but it cannot be accepted until a C-14 date can be obtained on the site.

The dates given for "European contact" in each column are unexplained and raise several questions. The date 1535 for Trans-Pecos Texas, we must presume, applies to Cabeza de Vaca's westward trek, although if he passed through this region at all, it must have been about two years later. In the coastal region, 1533 must also indicate de Vaca, although to be consistent, 1528 would be better, for that was the year the Narvaez expedition was wrecked. In the Panhandle, 1543 should be corrected to 1541, the year of Coronado's crossing. The date of 1550 for central Texas does not conform to any exploration I can think of; perhaps it should be 1650, when Castillo and Martín penetrated from Mexico to perhaps as far as present San Angelo. The date of 1687 for northeastern Texas is the year of LaSalle's second attempt to march northward from Fort St. Louis on the coast, but it is 145 years too late for the first penetration into the Caddoan town by the DeSoto survivors under Moscoso.

The bars in Figure 50, apparently meant to mark the earliest appearance of various tribes, again raise many questions. (The dates below are estimated by ruling across the table.) We must believe that the Apache occupied the Panhandle more than 5 to 10 years before Coronado. The Comanche are not recorded in the Panhandle as early as 1700, and they did not move down into central Texas until well after 1800. For what reason are Coahuiltecans shown in central Texas about 1575? There is some reason to think that these tribes occupied part of extreme southwestern Texas for a long time before Europeans arrived, but the matter requires study. What is the evidence for Apache in central Texas by 1600, and Tonkawa by 1625? Why begin the Karankawa (and Rockport focus) on the central coast at late as 1500, or a generation before de Vaca? Were the Coahuiltecans or the Bidai ever located in the coastal belt? Why mark the Bidai, Atakapa, and Arkokisa at about 1700, 1725, and 1800 respectively, and in that order? Granted that the vertical bars roughly indicate first mention of a tribe in some cases, they fail to distinguish the known newcomers from those with a long archaeological background preceding discovery by Europeans.

Some sentences are of twisted meaning. Referring to the Caddoan block in northeastern Texas, Stephenson says (p. 156) that "In historic times it may be said that the Fulton aspect remained dominant and two new foci of that aspect developed." Actually, the characteristic cultures of the Fulton aspect, with the great bulk of material referred to this aspect, disappeared before European trade objects appear, and it is only the sparsely represented Glendora and Allen foci which carry the Caddoans into historic times. I know of no reason to extend the Fulton aspect to 1850, because for archaeological purposes all native crafts seem to have been abandoned by 1750 if not earlier. In support of his "European contact circa 1687" for the northeastern area, Stephenson begins both the Glendora and Allen foci at 1700, again evidently to suit himself regardless of what has been written by others.

The "agricultural horizon" is said not to appear in central Texas "until about a century prior to the historic period, and is even then only semi-agricultural" (p. 153). The more or less permanent settlements suggested by many sites in the Edwards Plateau area have lead some to suspect that agriculture *may* have been practiced to some extent, but there has never been any evidence of it, and I know of no one else who would write so blithely of such a horizon, a century before the historic period or at any other time. The Central Texas aspect, while including small, light arrow points and small amounts of *trade* pottery, is not noted for "semi-permanent villages" but rather for many very small and impermanent settlements; the semi-permanent sites are many and deep but belong to a long period of pre-European occupation — the Round Rock and Clear Fork foci defined by Kelley.

On page 152 occurs the expression "Folsom, Clovis, and Scottsbluff cultures." These are not, of course, cultures, but projectile-point names. On page 153 we read that in Montell Shelter and Sabinal Cave, "Folsom type artifacts were found associated with remains of extinct fauna." Such artifacts were *not* found in Montell Shelter, excavated by the Texas Memorial Museum. In Sabinal Cave, the Museum did *not* find fluted points in association with extinct fauna even though the work

there made this association seem very probable. The reference given (Sellards, 1947) was published before these excavations were made.

Sellards' 1947 publication is cited in several other instances. Since this is his well-known index, containing no original papers, one wonders if the originals were consulted at all. In fact, the whole article reveals an inadequate acquaintance with source material, problems of interpretation, and unpublished data which have been made available to the author by University of Texas archaeologists over a period of years. None of us, I hope, are averse to differing opinions, but we like to see them substantiated.

ALEX D. KRIEGER
University of Texas
Austin, Texas
November, 1950

THE ALFRED VINCENT KIDDER AWARD

On November 1, 1950, Alfred Vincent Kidder retired as Chairman of the Division of Historical Research, Carnegie Institution of Washington. His direction of that division and his earlier work at Andover and Harvard together constitute a tremendous contribution to the prehistory of the New World and to the science of archaeology. Throughout his career he has accumulated, along with academic honors and scientific triumphs, a host of staunch personal friends. As a tribute to his leadership the Alfred Vincent Kidder Award has been established.

The award consists of a medal to be given every third year to a person chosen by a committee of the American Anthropological Association for achievement in American archaeology, particularly in those fields to which Dr. Kidder has contributed so much, the Southwestern United States and Middle America.

The medal is of bronze, three inches in diameter. The obverse bears a design taken from a carved slate mirror-back excavated by Dr. Kidder himself at Kaminaljuyu in Guatemala. The reverse is a conjectural detail of a Southwestern cliff dwelling. The designs and the sculpturing were executed by Tatiana Proskouriakoff. The medals were made by the Robbins Company of Attleboro, Massachusetts.

The fund committee consisted of Robert Wauchope, chairman; J. O. Brew, Gordon F. Ekholm, Emil W. Haury, Jesse L. Nusbaum and H. E. D. Pollock. One hundred medals have been deposited in the Peabody Museum of Harvard University. The Museum has agreed to deliver one of the medals properly inscribed every third year for three hundred years to a recipient designated by the President and Executive Board of the American Anthropological Association.

The large original bronze castings of the medal have been mounted and were presented to Dr. Kidder at a simple ceremony in his office at Frisbie Place, Cambridge, on November 1st.

The American Anthropological Association selected as its first Kidder Award Committee, Alfred L. Kroeber, Alden Mason, Frank H. H. Roberts, Jr., George Brainerd and Irving Rouse. At the annual dinner of the Association at Berkeley, California it was announced that the first recipient was the dean of Middle American archaeologists, Alfred Marston Tozzer. Dr. Kidder had been a member of Professor Tozzer's second class at Harvard.

Much to the gratification of both committees the secret was kept completely. The Fund Committee has completed its work and has been dissolved but the individual members will always be grateful for the high degree of cooperation they have received.

BOOK REVIEWS

El Valle y la ciudad de México en 1550. Relación histórica fundada sobre un mapa geográfico, que se conserva en la biblioteca de la Universidad de Uppsala, Suecia. S. Linné. The Ethnographical Museum of Sweden, Stockholm. New Series. Publication No. 9, xv, 220 pp., 55 figures, 11 plates, 1 map facsimile in colors. Stockholm, 1948.

The famous sixteenth-century vellum map of the Valley of Mexico, preserved in the University Library at Uppsala in Sweden, is the subject of this handsome volume. A full-color gelatin process facsimile, 36″ by 26″, printed in Sweden, accompanies the book. It provides students with the first fully reliable reproduction of this important document. Earlier reproductions were inaccurate, excessively reduced, or extremely rare. The new facsimile is an indispensable source for achaeological and ethnological studies of the Valley of Mexico, in both pre-Conquest and early colonial stages.

Sigvald Linné's text is divided in three parts. I and II aim to orient the general reader. Part III is for the specialist. Parts I and II agreeably recapitulate the history of the Spanish Conquest, and identify the place names and the scenes of the map. A translation of the Latin description of the city *ca.* 1554 (written as a scholarly colloquy by F. Cervantes de Salazar, the first professor of rhetoric at the University) accompanies the description of the topographic details of the map. In this part of the commentary Linné also draws upon other eye-witness accounts of the sixteenth-century appearance of Mexico City, and upon modern ethnological studies in the region.

Part III offers an historical critique of the value of the map as a source. There is also an essay on the hydrography of the Valley of Mexico, and an essay upon native American cartography. The importance of the Uppsala map is well defined; the only earlier map of Tenochtitlán is the stylized Nuremberg (Cortes) map of 1524. The only more detailed map of the period is the misnamed fragment called *Plano en papel de maguey*, thought to date *ca.* 1558. The historical section reviews and clarifies the various earlier opinions on the history of the map since its discovery by A. E. Nordenskiöld in 1880. Linné retraces the known history of the map. He supposes that it was drawn in Mexico by natives, and brought to Spain before the retirement of Charles V. It may have been moved to Prague during the sixteenth century, and it was acquired for Sweden probably *ca.* 1648.

The work of several Swedish scholars upon the paleography of a badly damaged inscription is presented. This Latin inscription was added after the map was completed, and was apparently not included by the original design. It presents the map to Charles V, and mentions the name of Alonso de Santa Cruz, the distinguished Spanish geographer. The map for this reason has long been erroneously attributed to Alonso de Santa Cruz. Linné, following Toussaint, furnishes fresh proof that the attribution is incorrect, and he advances the theory that the map was the work of Indian pupils of the famous Colegio de Santa Cruz at Tlatelolco, who prepared it under European direction. The theory is inherently probable.

Toussaint, Fernández, and Gómez de Orozco dated the map as of the period between 1556 and 1562. Linné prefers an earlier date by at least several years, and would not reject a date before 1550. Toussaint's main argument for a date after 1555-1556 was that the map shows the eastern dike, or *Albarradón de San Lorenzo*, which was built 1555-1556. Linné hesitates to recognize Viceroy Velasco's work in this part of the map, and points out that an earlier dike might have existed.

Linné also finds it significant that the Hospital Real de Indios is not shown on the Uppsala map. He states that the Hospital was founded in 1551. Fernández, however, published documents in 1939, proving that the Hospital was founded only in 1553, and still unfinished in 1556 (*Anales del Instituto de Investigaciones Estéticas*, Mexico, 1939, 3, p. 27). Hence the absence of the Hospital from the map does not invalidate a dating at about 1555-1556.

Linné further points out that the Cathedral edifice is labelled "Iglesia mayor" on the Uppsala map. He argues that because Fr. Juan de Zumárraga became Archbishop in 1547, the map should have described the edifice as *Catedral*, had it been drawn after instead of before 1547. Against this argument, there is the evidence of Archbishop Zumárraga's testament, dated 1548, in which the Archbishop himself refers to his Cathedral as the "iglesia mayor" (J. García Icazbalceta, *Don fray Juan de Zumárraga*, Mexico, Ed. Porrúa, 1947, III, 287), fully a year after his elevation.

The reviewer would therefore adhere to Toussaint's date, not earlier than 1555-1556, rather than Linné's new proposal of 1550 or earlier. The point is of real importance, for it concerns one of the most remarkable campaigns of urban reformation in history. The rate of change in this great city was high enough in the half-century following the Conquest, for radical shifts in theory and practice to occur within the span of as little as five years.

The evidence and arguments for an earlier date are presented by Linné with full awareness of their implications. He does not force his conclusions upon the reader, and leaves the question open with admirable restraint.

Throughout, the work is one of exact historical scholarship, so arranged that lay reader and specialist alike can benefit. The Spanish text will make many friends for Sweden in Mexico. The volume appears in the same series, format, and quality of workmanship as Linné's earlier studies on Teotihuacan and on Zapotecan antiquities.

George Kubler
Yale University
New Haven, Conn.

The Maya Chronicles. A. BARRERA VASQUEZ AND SYLVANUS G. MORLEY. Carnegie Institution Contributions to American Anthropology and History, Vol. X, No. 48, Washington, 1949, 86 pp. 2 figs., 6 tables.

The essential unity of the historical chronicles in the *Chilam Balam of Mani*, the *Chilam Balam of Tizimin*, and the *Chilam Balam of Chumayel* (first chronicle) has long been recognized, but this is the first publication to show that all three are only variants of a single text, and to attempt a reconstruction of that text. This is, indeed, a noteworthy advance in Maya scholarship.

The introduction gives a useful and scholarly bibliography of the surviving Books of Chilam Balam. Besides the reconstructed text derived from Chronicle I (Mani), Chronicle II (Tizimin), and Chronicle III (Chumayel I), new translations are offered of the other two Maya chronicles to put the comparable historical data together, Chronicle IV being the second Chumayel chronicle, and Chronicle V the third Chumayel chronicle. The lengthy historical footnotes to all the chronicles cover the material extensively.

Unfortunately, no attempt is made to trace the manuscript tradition of the chronicles. Thus Morley (p. 55) says that the source for Chronicle I and Chronicle II is probably a pre-conquest Maya manuscript. This conclusion is rather surprising, as parallel, incorrectly dated entries continue in both texts to 1611, and the text is surely subsequent to that date. References to Mani in the text would suggest that the *Tizimin* is a copy of the post-1611 *Mani* (now lost but preserved in a copy known as the *Codex Perez*). This is further indicated by the fact that these two chronicles have a number of entries dealing with the Xius, which are not found in Chronicle III, and the Xiu capital was Mani.

Aside from the Xiu entries, Chronicle III contains parallel entries down to the death of Landa in 1579, so that the chronicle as we have it must have originated subsequent to that date. This tends to lower its authority below Gaspar Antonio Xiu[1] and Landa, both of whom were writing earlier than this and were very familiar with the history.

Chronicle V follows a completely different tradition in its pre-Columbian sections; the few post-Columbian entries parallel Chronicle III, but this may be coincidental. This also notes the death of Landa and must be subsequent to 1579.

It is unfortunate that no attempt was made to trace the source of the inaccurate Christian dates of Chronicles I and II, as that might have thrown some light upon the author. Some parallels with similar mistakes in the very corrupt *Chronicle of Nakuk Pech* suggest that this may have been available to the chronicler.

Generally speaking, the footnotes on details of translation seem less adequate than the historical notes. For example, *paxci* sometimes appears as *abandoned* and sometimes as *depopulated*, which can considerably change the historical picture. The context seems to warrant this varying usage, but footnotes on this and other difficult phrases would be welcome.

An excess of caution in atempting to maintain the structure of the texts as we have them, in the reconstructed text has led to the placing of parallel passages at two or more points in the reconstruction. While it is sometimes difficult to determine in just which spot a given entry belongs, it seems misleading to make two entries when the original text almost certainly had only one. The following passages seem to be parallel (*citations are by the numbered lines of the reconstructed text*): line 104 (Chron. I) and line 115 (Chron. II); lines 181-183 (Chron. I) and lines 170, 172 (Chron. II) and lines 170, 171, 173 (Chron. III); lines 179-180 (Chron. I) and lines 198-199 (Chron. II and III); lines 186-188 (Chron. I) and lines 225-226 (Chron. II).

A purely structural parallel may be found between lines 177-196 (Chron. I) and lines 223-224 (Chron. II) where a katun 11 Ahau is followed immediately by a katun 8 Ahau. This is rather important because the events here assigned to katun 11 Ahau have parallels both in the supposedly succeeding katun 8 Ahau when Mayapan fell, and supposedly preceding katun 8 Ahau when the plot of Hunac Ceel occurred. Contrary to currently accepted views, there is evidence that more than one katun count was operating in Yucatan in late pre-conquest times, and this is important supporting evidence.

Difficult as some of the problems of textual reconstruction are, the historical reconstruction is even trickier. Thus Morley (p. 57) says, "Chronicle III . . . is, nevertheless, in such close chronological agreement with both I and II throughout the twelve centuries of Maya history, that we are forced to conclude that these three sources accurately set forth the main course of events in northern Yucatan during this period." Here, and throughout, Morley's familiarity with the sources, gained when no one realized the identity of these chronicles, has betrayed him into thinking of them as separate sources. This has always been the chief factor in overweighting this chronicle against Chronicle V, which gives more names, more exact dates, and a list of katun stones which lessens the chances for a mistake in dating. There are difficulties in the way of accepting either chronicle too unreservedly, but arbitrarily re-arranging the entries of Chronicle V to agree with Chronicle III, as Morley does, raises as many problems as it solves.

The re-arrangement of material pertaining to the Xius, to make them later than the Itzas, clearly agrees with the statements of Landa and of Gaspar Antonio which indicate that the chronicles, whether by accident or design, give a misleading impression of antiquity. Since the Xiu entries of Chronicles I and II are lacking from Chronicle III and, therefore derive from a different source, they should perhaps have been reconstructed into a separate chronicle. The additional conclusion that the Itzas were Old Empire Mayas will probably not

[1] Jakeman, M. W., 1945, "The Origins and History of the Mayas, Part I," Los Angeles, has reconstructed the text of Gaspar Antonio's version of Maya history from scattered *Relaciones del Yucatan*.

meet immediate acceptance, although I believe it is correct.

Once it is admitted that some of the entries need re-arranging, many alternatives are possible. One, which makes a fairly plausible historical picture, would be to identify the *uudz* katun as a specific katun 8 Ahau (not identifying it with those katuns 8 Ahau which were not specified as the *uudz* katun). This has the advantage of making the occupation, abandonment, and reoccupation of Chakanputun synchronous with the same happenings at Chichen Itza, indicating general movements.

One important element of the reconstruction on which Morley and Barrera Vasquez disagree is the meaning of the statement that Chakanputun "died" because of Kakupacat and Tecuilu (Chronicle V), Morley regarding it as the end of Itza occupation (katun 8 Ahau, about 950 A.D.) whereas Barrera Vasquez regards it as the forcible re-establishment of the Itza in Chakanputun (katun 13 Ahau, about 1280 A.D.). This is important, as it involves the documentary evidence for the date of the founding of Mayapan.

DAVID H. KELLEY
Cambridge, Mass.

Guide to the Codex Perez. RALPH L. ROYS. Carnegie Institution, Contributions to American Anthropology and History, Vol. X, No. 49, Washington, 1949, 20 pp.

Prophecies for Tuns in Tizimin and Mani. RALPH L. ROYS. Carnegie Institution, Contributions to American Anthropology and History, Vol. X, No. 51, Washington, 1949, 34 pp., 1 fig.

Roys lists the contents of the *Codex Perez* and gives a detailed historical, chronological, and bibliographic background. The publication of the Maya text of the *Codice Perez* with a Spanish translation by Solis Alcala, Merida, 1949, has enhanced the value of Roys' commentary upon the various sections at the same time that it has made the actual listing of the contents obsolete. Roys' discussion of the historical background of this and other manuscripts is especially valuable, and he makes many suggestions in passing which warrant elaboration and deserve the careful attention of Maya scholars. He points out that the emphasis of study of the books of Chilam Balam was originally on the chronology, and then shifted to prophecies, but that the historical allusions in the prophecies have remained largely unstudied.

The listing of parallel passages in other works will be of special value to students, particularly those unable to work directly with the original sources.

Roys' study of "The Prophecies for the Maya Tun or Years in the Books of Chilam Balam of Tizimin and Mani" is an attempt to fill in part of the gap in the study of the prophecies. The particular prophecy chosen gives the twenty-one years which include a Maya katun 5 Ahau. Variants in the text of the prophecy are given, and there are ample annotations, both as to details of translation and as to comparison with other materials. The prophecies include a wealth of material on gods, supernatural beings, monstrous animals, and omens. This translation will be of great interest to those who wish to get some idea of the range of Maya theogony, but can not read Maya.

This prophecy has previously been translated by Barrera Vasquez (*Libro de los Libros de Chilam Balam,* Mexico, 1948, pp. 167-188) and by Solis Alcala (*Codice Perez,* Merida, 1949, pp. 199-227). There are important differences in all of these translations, and working with such difficult material, it is probable that each is correct on some points in which the others have erred. Nevertheless, Roys' translation most thoroughly presents the evidence to allow a reader to make his own judgment between alternatives, and will probably be used most widely by scholars.

DAVID H. KELLEY
Cambridge, Mass.

Surface Survey of the Virú Valley, Peru. JAMES ALFRED FORD AND GORDON R. WILLEY. 1. Virú Valley: Background and Problems, by J. A. Ford and G. R. Willey; 2. Cultural Dating of Prehistoric Sites in Virú Valley, Peru, by J. A. Ford. Anthropological Papers of the American Museum of Natural History, Volume 43, Part 1, New York, 1949. 90 pp., 7 pls., 9 figs. $1.50.

This monograph is the first full-length report on the field researches of the cooperative Virú Valley Project on the North Coast of Peru in 1946, and if those awaiting publication are as well-presented and contribute as much as this one, the advantage of extensive cooperative research programs will be concretely demonstrated. Since Willey and Ford worked together in the field, even though on separate problems, and originally Willey's paper on settlement patterns was to have been published with Ford's, Section 1 contains a jointly-written introduction giving a brief statement of the archaeological background of the North Coast of Peru, the terminology of the culture periods in the Virú Valley and their equivalents outside the area, and the aims of the study. In addition, Ford and Willey have prepared a brief history of the formulation of the Virú Valley Project, the division of the various problems among the participants, the field and laboratory procedures, the free interchange of data, and the unified system of cataloging, site numbering and ceramic nomenclature devised so that in each monograph on the Virú Valley, regardless of author, the sites under discussion will carry the same numbers, pottery types will be uniform with identical names, and the maximum consistency will be achieved.

Following these introductions the authors describe "The Natural Valley," giving its general setting along the North Coast of Peru, the natural environment within the Virú Valley and the present-day settlement pattern. Accompanying these pages is a reproduction of the master map of the Virú Valley Project showing geographical features and all the archaeological sites studied. Although brief, the geographical descriptions are clear, vivid and accurate.

Ford's project, to date a maximum number of sites in the valley by means of a surface survey, is covered in the second part of the monograph. "Mean cultural dates" derived from fitting the surface collections into the summary graph of the valley chronology are given for all the surveyed sites, providing the foundation for Willey's study of the change in prehistoric settlement patterns. But beyond this immediate practical application, Ford's monograph makes what the reviewer feels to be a fundamental contribution to theoretical and applied archaeological methodology. To use Ford's own words, it provides "an exposition of some techniques for measuring culture history and time change which are slightly different from, and in some details possibly are an improvement on, the current modes of handling chronological problems. This possible slight improvement in technique lies in giving more emphasis to the quantitative aspect of cultural change. . . ." (p. 31).

Concisely, yet clearly, Ford presents the problems which faced him in Virú Valley: the necessity of utilizing plain wares to establish a time sequence because of the slight occurrence (only 1-5%) of decorated wares at habitation sites, the variety of the sites (dwelling units, middens, pyramids, hilltop fortresses, public buildings, canals, cemeteries, etc.) that he was expected to date, the limited applicability of the previous chronologies of the North Coast established only on highly-selected grave goods, and the necessity of determining the limits within which a surface sample could be expected to give reliable results. A graph illustrating this last point should prove of interest to the archaeologist who wants to know how many sherds are needed in a surface survey to give a fairly accurate picture of the cultural occupations.

Preceding the actual analysis of ceramic material is a section called "Classification" (pp. 38-43) which should appeal to students of archaeology who are interested in the difference between the classification of archaeological material for the primary purpose of creating "an instrument for measuring culture history in time and space" as compared to that of pure description. Ford's exposition of the theoretical assumptions that apply to the establishment of a time scale in a small area, such as the Virú Valley, and those on "What Is A Pottery Type?" and the "Popularity Characteristics of Types Through Time" are excellent. All archaeologists, professional, student or amateur, can benefit from a reading of this material.

Anyone contemplating extensive surface surveys, and students of archaeology in particular, will profit immensely from the detailed account of the actual mechanics of classification, analysis, and seriation of the 84,547 sherds from 308 collections made from 263 sites scattered over the entire Virú Valley. In a careful and methodical manner Ford describes the limitations of the method, the advantage derived from access to vertical stratigraphy resulting from the work of other members of the project, the evaluation given to each strata cut when it was interdigitated into a master time chart, the mechanics of seriation and the fitting of the surface collections into the summary graph, and then an interpretation of the material into a "mean cultural date" for each site. A list of sites by number with these dates and other pertinent information is found in Appendix II.

One of the most commendable points in the monograph is that the limitations of the methods and techniques are always discussed whenever present. As a result of these detailed explanations, the reader is immediately able to evaluate the various steps of the process in light of his own experience or knowledge. The methodological steps are well-illustrated by numerous graphs and charts dealing specifically with the results of the surface survey.

While the above-mentioned sections should be of interest to all archaeologists, the latter parts of the report apply more specifically to the archaeological problems in Peru. There is a summary of the "Ceramic History of Virú Valley" which, although more abbreviated than those that will appear in some of the forthcoming monographs, characterizes each period in some detail from a ceramic standpoint: Guañape Period, simple incision and no painted ware; Puerto Moorin Period (Salinar), the appearance of White-on-Red style; Gallinazo Period, negative painting; Huancaco Period (Mochica), elaborate painted and modeled ware; Tomoval Period (Coastal Tiahuanaco), red, black and white style; La Plata Period (Chimu), predominance of mold-made and black ware; and ending with the Estero Period showing Inca influence. Condensed pottery type descriptions are given in Appendix I. Ford analyzes the rims and vessel shapes of the most popular pottery types, as well as the chronological position of miscellaneous forms and objects, such as "corn poppers," clay trumpets, grater bowls, etc., and presents this data in charts combining pictorial display and bar graphs and accompanied by explanations.

In his comparison of the Virú chronology with stratigraphic and seriated sequences of other parts of coastal Peru, Ford is restricted by the limited amount of such work. Except for Strong and Corbett's Pachacamac and Willey's Chancay sequences, Coastal Peruvian chronologies are based solely on ceremonial ware. The potential importance of such a statistical comparison is shown by the conclusion Ford is able to draw about the direction of diffusion of one ceramic trait, represented by Queneto Polished Plain in the Virú Valley and Polished Black at Pachacamac, in spite of the limited data at his disposal. Ford states, "Both quantity and relative temporal position indicate that this trait is moving down the coast from the north" (p. 59).

The only part of Ford's cultural interpretation that might not meet with the approval of some of the other authorities on Peruvian archaeology, is his concept of "burial cult ceramics." He introduces this concept to account for the great deviation between the utilitarian ware traditions and the elaborate wares most typically found in the cemeteries. Ford sees this separation as

the result of the development of a "class of priest-potters" who must have been engaged only in the manufacture of special wares for burial purposes.

In closing, the reviewer wishes to comment on the excellent graphic method of presentation, which Ford seems so skillful in devising. Not only is the effect an artistic one, but the combination of three-dimensional drawings and graphs on the same chart is an extremely lucid and forceful presentation of the material. Figure 6, the time distribution of rim and body shapes of five of the most popular pottery types, and Figure 9, a diagrammatic summary of the ceramic history of Virú Valley, are the best examples of this method. More graphic presentations of this sort would be welcome in archaeological reports. In addition, one cannot help but praise the superior job of chart printing and the outstanding, clear collotype reproductions of sherds in all seven plates.

Ford's monograph is a must in every archaeologist's library. If one is not a South American specialist and therefore able to profit from this first application of the extensive analysis of plain wares to the specific problems of Peruvian ceramics, he will still find invaluable this dissertation on the methodology, technique and quantitative analysis of surface surveying, a "phase of archaeological research that has by no means been entirely neglected by American students, but that certainly has not yet been fully exploited."

CLIFFORD EVANS, JR.
University of Virginia
Charlottesville, Virginia

The Bell-Philhower Site, Sussex County, New Jersey. WILLIAM A. RITCHIE. Indianapolis: Indiana Historical Society, Prehistory Research Series, Vol. III, No. 2. 123 pp., 1 fig., 23 plates, 2 tables. 1949.

During the field season of 1947 William A. Ritchie, receiving a grant from the Indiana Historical Society, explored Minisink, a historic Munsee town in northern New Jersey. This archaeological work was one of the several approaches of anthropological research furthered by the Society in its attempt to interpret the Walum Olum, the traditional migration record of the Lenni Lenape or Delaware Indians.

In effect, the work constitutes a reappraisal of Heye and Pepper's (1915) investigations on the same site, with particular emphasis on the earlier prehistoric occupations. As a result, the cultural history of this interesting site was thrown into sharper relief.[1] Probably one of the richer sites in New Jersey, it was excavated over the years since 1899.

In terms of cultural chronology, principally derived by ceramic typology, the Bell-Philhower site represents a "continuum of occupation" from late prehistoric Castle Creek Focus of the Owasco Aspect to the full historic period. The latter period ushered in Mohawk and/or Oneida-Onandaga Iroquois influences. There was an early occupation represented at the site which was found in minor representations in the subsoil. This material is equated with Cross' (1941) Red Valley Focus, the regional equivalent of the Early Focus of the Coastal Aspect.

In this copiously illustrated publication Ritchie devotes most of the pages to two tables, which take up 44 pages. These tables (Table 1, Pit Analysis; Table 2, Traits) succinctly present the basic field data, which if given in ordinary text form would have necessarily taken many pages of reading. Preceding the Tables in the *Contents* are the following headings, including the Historical Introduction: Archaeological Cultures of the Minisink Island Area; Prior Excavations on the Bell-Philtower Site; Excavations of 1947 on Bell-Philhower Site; Artifacts; Pit Analysis, and Historical Reconstruction and Conclusions. These subjects take between 3 to 12 pages each. As has been intimated above, the tables present in condensed form the main body of the material.

Although the work seems to be amply illustrated, there are some photographs which have obviously suffered in the printing. Unfortunately, this affects the usefulness of Ritchie's labor, since among the illustrations there are some critical pottery types. For one thing, all of the plates of artifacts could have been larger. However, this problem properly belongs to the realm of the mechanics of publication, with which we are not concerned here.

Since the bulk of Ritchie's interpretations rest on ceramic typology, a specialty which he has developed as Parker's successor in New York, the reviewer will lay particular emphasis on the pottery scheme. Heye and Pepper's (1915, p. 62) original studies of the ceramics disclosed three pottery types — those of probable Algonquian origin, of Iroquois origin, and "a few that seem to combine techniques common to both types." Ritchie, expanding the classification further, finds five major categories, including (1) Castle Creek Focus, (2) Transition or Castle Creek Epigonous, (3) Iroquoian types, (4) a new type known as Overpeck Incised, and (5) a considerable number of indeterminate types. According to the chart (Fig. 1), there are 16 types in the Owasco series, which are described in more detail in Ritchie and MacNeish (1949), which offhand might seem to be a formidable number to archaeological understanding. Using a seriational method in the "quantitative" technique, recently illustrated by Ford (Ford and Willey, 1949), Ritchie places the heaviest occupation of the Bell-Philhower site late in Owasco times. Seventy-five per cent of the identifiable sherds and pots belong to Owasco.

[1] Dorothy Cross's *Archaeology of New Jersey* (1941) appeared before Ritchie and MacNeish's (1949) key to New York ceramic sequences was published. However, she pointed out that most of extreme northern New Jersey was more closely affiliated with the Rosenkrans Ferry, or "Late Focus" (p. 211) than with the rest of New Jersey. This focus shows first influence by Castle Creek, then by Iroquoian pressures. Certain correlations can be made between Minisink and Rosenkrans Ferry (pp. 142-143).

The term epigonal (which suggests Peruvian studies) as used by Ritchie to define a transitional Castle Creek pottery, seems to be aptly used. It is better than Skinner's (1919) "Sub-Iroquois" ware, and in a sense is more broadly definitive than Smith's (1947) "Clason's Point Focus." Calling the transitional Epigonous ware a "decadent" Castle Creek ware (p. 188) introduces a new germ of thought. An important note (p. 177, footnote) is made in which Ritchie flatly denies the possibility that Iroquois culture is derived *in toto*, or solely from an Owasco background.

In the analysis the author throws into play several other new pottery types, including Overpeck Incised, Chance Incised, Hudson Valley Crescent Incised, and Kingston Incised. The Owasco ceramic types are studied in detail in Ritchie and MacNeish's (1949) report, hence they are not fully described in this publication. For a fuller treatment of the Iroquoian types we are referred (p. 179) to a future publication by Richard S. MacNeish.

Historic Munsee is believed to be a final stage of development from prehistoric Castle Creek, which represents an importation from up river in New York state. For the introduction of the Iroquois pottery Ritchie poses two alternatives (p. 100), one of which seems to be better than the other (viz: that the Munsee had amiable relations with Esopus tribes of the Kingston area). However, it is speculation either way.

Mentioning the excavations in brief, we note that the land had been under cultivation for over a century and a half. This, according to Ritchie, probably obliterated any house patterns and post molds if any were extant. In view of the short time allowed, apparently there was no other choice but to follow the most expeditious and fruitful plan possible, that of pit excavations. One hundred pits were opened (Plate 1).

Ritchie's work in northern New Jersey represents an important contribution. He brings to bear his background specialty of ceramics on a knotty ceramic problem, which we assume would have had to be studied in the light of New York prehistory. Therefore it is fortunate in this regard that the author was given the opportunity to perform the job. Nowhere do we find that the Walum Olum has been further elucidated —however, that remains for the combined study to work out. This much we know, the Munsee possessed the Castle Creek culture on their entry into northern New Jersey from southeastern New York.

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Ralph S. Solecki
River Basin Surveys
Bureau of American Ethnology
Smithsonian Institution

Prehistoric Southwesterners from Basketmaker to Pueblo. Charles Avery Amsden. Southwest Museum, Los Angeles, 1949. xiv, 163 pp., 39 plates, 2 maps, 46 figs.

This eagerly awaited volume is a monument to a man whose work was ended too soon. Charles Amsden died in 1941 leaving a manuscript which Dr. Hodge and other members of the Southwest Museum staff have brought out in a manner to honor his memory. Handsomely illustrated, in clear and legible type, it is an outstanding job of publication as well as one of the most readable contributions to Southwestern archaeology to date. The writing is in popular style, and the many explanatory, even philosophical, asides are obviously intended for a non-professional public. Nevertheless, the book can be recommended as a splendid introduction to university courses in American archaeology, to those studying Southwestern archaeology, or, even more particularly, to those specializing in Basketmaker-Pueblo culture. It also fills the need, so often felt, for some authoritative but not-too-technical work to give to Aunt Sofie, either to reconcile her to her nephew's pursuit of archaeology or in the hope that she will develop an active interest to the point of subsidizing similar research with a little of Uncle Ebenezar's cash.

The volume opens with a personal and anecdotal account by Dr. Kidder of Amsden's archaeological life. There follows a chapter which includes a somewhat floridly written section on the southwestern landscape and a longer and more straightforward sketch of the conquest, colonization, and scientific exploration of the Southwest. The second chapter concerns the Douglass system of tree-ring dating and its importance for archaeological research. It is unfortunate

that the editors or other critical readers did not substitute the correct term "dendrochronology" for the incorrect one "dendrology" which is used throughout this particular chapter; the two are by no means the same!

The succeeding six chapters give a topical description of the life and customs of the Basketmaker people(s), as they first appeared on the scene and then through the changes by which they developed into sedentary farmers from the more roving farmer-hunter existence of their early days. Amsden's approach is ethnographic and cultural rather than archaeological as usually practiced today. That is, he describes and, insofar as he believes it justified, explains the life of the people instead of giving a catalog of artifact descriptions and comparative studies. My own reaction to this procedure is, of course, enthusiastic. I believe that this can and should be done for many, if not most, of the better known cultures in the archaeological literature.

Whether Amsden has correctly evaluated and rightly deduced is immaterial in the broad view. Personally, I go along with him in some of his inferences, but not in others. For example, I find his conclusions based on Zingg's tables of Basketmaker-Uto-Aztekan concordances to be suspect, because those tables themselves, as I have stated in my previous review (*American Antiquity*, Vol. 8, No. 3, 1943, pp. 307-310), are logically unsound and mathematically incorrect. But such particularized criticism in no way affects the contribution Amsden has made in essaying those very inferences. He makes his picture of Basketmaker culture a matter of people *and* things, not merely of things alone. I do not recommend this method solely for its humanizing effect or for its popular appeal. I am enthusiastic about it because I believe that such an approach is necessary as prerequisite to cultural, i.e., anthropological, studies. Culture is not merely a question of material objects. It is, more than that and primarily, a matter of mental reactions to these and other "objects." If we would study human culture, therefore, we must, as Professor Sapir used to repeat, put the people back into culture. To a considerable extent, this is what Amsden has done, and other archaeologists might well lift their heads from their potsherds and take note.

Finally, and constituting not the least of its values, the book contains an extended bibliography of twenty-one pages with titles as late as 1949. This is intended to supplement the basic Southwestern bibliography published in 1924 by Kidder in his *Introduction to Southwestern Archaeology*. Dr. Hodge has appended a note saying that "It is hoped that in due time a complete annotated bibliography of Southwestern archaeology in all its ramifications will appear." Whether this is meant to imply that such is already being compiled at the Southwest Museum or whether it is meant to encourage others to do so, let me add my voice to the hope! Nothing would be more valuable to the field today.

In closing, I feel that I must put forward a caution to those who might suppose that, with the publication of the volume here in review, Basketmaker culture has been given full and final treatment. This book does not do for Basketmaker culture what, in my opinion, needs doing most. Amsden has included in his descriptions only a selected sample of the available empirical data — even as of the time he wrote. He has not dealt with his material quantitatively nor with total cultural rosters from individual sites. He has not given us the distributional studies we need. His analysis of culture-geographic factors is superficial. In other words, while one can hail his approach and his breadth of vision, especially as of the late nineteen-thirties when he wrote the monograph, nevertheless one also feels that the last word has not been said — even about those Basketmaker data which were available to him then.

This is said in no way as a point of criticism. It is mentioned to give the reasons for saying that the door is still open, and wide, to a complete and fully documented treatment of the Basketmaker material. In order to elucidate the present status of our Basketmaker knowledge and to relate it to what we know of other, pertinent cultures and geographical facts, we need a thorough, quantitative, distributional, geographical, interpretive, and cultural study which is, above all, documented. Amsden's monograph may well serve to arouse the necessary interest in such a project, and it will certainly be of great assistance in working one out. But it is not that study itself because it was not intended to be. Amsden outlined his own particular task and did it well.

WALTER W. TAYLOR
Santa Fe, New Mexico.

Uaxactun, Guatemala: Excavations of 1931-1937. A. LEDYARD SMITH. Carnegie Institution of Washington, Publication 588, 1950. xii+108 pp., 8 tables, frontispiece and 143 figs. $9.00 (paper), $9.75 (cloth).

This is the third major publication based on Carnegie Institution's eleven years of intensive excavation at Uaxactun in the Peten. The Ricketsons reported on the first five years; A. V. Kidder's *Artifacts of Uaxactun* appeared in 1947 as Carnegie Institution of Washington Publication 576. The present volume treats of the excavations, architecture, burials, and caches found during the seven years when A. Ledyard Smith was in charge. The final report on the ceramics, by Robert E. Smith, is now in preparation. During the years while excavation was still in progress and these final monographs were being written the Carnegie Institution staff released many preliminary reports and shorter publications which made the important Uaxactun data available.

Happily, Smith's *Uaxactun* is a book of synthesized information. In the old days it might easily have appeared as a five-foot shelf of bulging tomes. But this volume follows the principle that one page of good,

accurate illustrations is worth a hundred pages of minute description. It packs an enormous amount of information into small spaces; roofs, for example, are described in less than one column of text. Smith spares the reader many unnecessary hours of reading the dimensions and details of excavation such as whether a floor turned up to a wall or passed under it; he sifts this evidence himself, synthesizes the results, and draws his conclusions; if one wishes to investigate further, he can do so by using the appendices, scale drawings, and excellent photographic collotype figures.

Chapters 1-3 describe Uaxactun's main groups of structures, including excavated units not previously published. Chapter 4 traces the development of the city by evaluating the relative importance of these centers at different periods of prehistory. The focus of ceremonial activity shifted from one group to another, although no group was ever completely abandoned during Uaxactun's occupation. Among interesting information in these sections are evidences that the Maya made provision for both the drainage and storage of water, building an artificial reservoir near the beginning of the Early Classic period; that one important reason for digging chultuns was to extract soft marl for building; and that the Late Classic ballcourt had sloping benches.

Chapter 5 traces the evolution of stone-vaulted structures over a period of six hundred years, and Chapter 6 correlates ceramic, epigraphic, and architectural data. Chapter 7 treats of burials and caches. Smith's Early Developmental was the period of Mamom pottery, simple graves, skull deformation and filed teeth, shell and jade burial furniture. His Late Developmental was a pre-vault phase when Chicanel pottery was the mode, the Indians made simple and cist graves and urn burials, houses of perishable materials stood on low platforms. Early Classic began about 8.12.0.0.0 with a new impetus in cultural development reflected in the first stone-vaulted chambers, Tzakol pottery, and the stela cult. This "Vault I" architectural phase was characterized by slab masonry, elaborate and rich burials in simple, cist, crypt and chamber graves with bundle and urn burials, with evidence for human sacrifice. Late Classic brought new developments: Tepeu pottery, Vault II architecture with veneer masonry and specialized vault stones, and series of rooms around courts replacing the older "temple" structures; benches took the place of altars. Simple cist and crypt burials were no longer elaborate; females and children were buried under the floors of rooms and courts. This phase lasted from about 9.8.0.0.0 to 10.3.0.0.0.

Kidder's introduction to this volume is typically thoughtful, stimulating, and written in a refreshing style. Although almost every topic leads him far afield in its comparative implications, Kidder always manages skillfully to work back to his original line of thought, having enriched his account with the background, anthropological concepts, and unsolved problems connected with the topic under discussion. It becomes, as time goes by, more and more of a pleasure to read Kidder's introductions, prefaces, and his own reports, for he permits himself the beauty of literary expression, the emotion, and the humor that are so sadly missing in most archaeological presentations.

The superb Proskouriakoff restorations, which previously appeared in her *Album of Maya Architecture*, are again included in Smith's volume, together with Smith's and Shook's excellent plans, elevations, and maps on which they were based. The collotype reproductions are of finest quality. The format, which combines elegance with economy, is, as usual in publications edited by Margaret Harrison, impeccable. Carnegie's printed monographs of the past fifteen years or so have set a standard in editing that few institutions publishing similar reports have even approached.

Many years of *garrapata*-drawn blood, Peten sweat, writing toil, and publication tears went into this and other Uaxactun reports. Only the most important results and the very finest of publications justify the enormous expenditure of time and money which Carnegie Institution devoted to intensive investigation of a single Maya site under the most difficult and often dangerous field conditions.

ROBERT WAUCHOPE
Middle American Research Institute
Tulane University
New Orleans, Louisiana

The Gallinazo Group, Virú Valley, Peru. WENDELL C. BENNETT. Yale University Publications in Anthropology, No. 43, New Haven, Conn., 1950. 127 pages, 12 plates, 27 text figures, 8 tables. $2.00.

Bennett's report on the Gallinazo Group in the Virú Valley of Peru is one of a projected series of reports dealing with the Virú Valley Expedition of 1946 which was sponsored by the Institute of Andean Research. Preliminary notices concerning this expedition have already appeared,[1] and Bennett's is the second full report to be printed.[2]

The term "Gallinazo" as used in this report designates three different but related things: the type site in the Virú Valley, which with other close-by sites of a similar kind, is termed the Gallinazo Group; the Gallinazo culture which is predominantly found at these sites; and the Gallinazo period as it is known in the Virú Valley. The report is mainly concerned with the excavations made by Bennett in the Gallinazo Group in 1946, supplemented at times by material, where pertinent, from his 1936 excavations in the Virú

[1] Willey, Gordon R. *The Viru Valley Program in Northern Peru.* Acta Americana, Vol. 4, No. 4, pp. 224-238, Mexico, 1946.

[2] Ford, James A. and Gordon R. Willey. *Surface Survey of the Viru Valley, Peru.* Amer. Mus. Nat. Hist. Anthrop. Papers, Vol. 43, New York, 1949.

Valley. The materials recovered from these excavations, which include types of construction, are considered in detail as well as the placement of the Gallinazo culture in relation to other cultures in the Virú Valley and to Peruvian prehistory as a whole.

Excavation was somewhat simplified by the fact that the survey of the Virú Valley by Ford and Willey, as their part of the joint program, allowed Bennett to concentrate on twenty of the thirty known Gallinazo sites within the Group. Stratigraphic excavations of Strong and Evans elsewhere in the valley established the sequence and types of pottery likely to be uncovered in the Gallinazo period. It was not necessary, therefore, to duplicate the work of others by removing debris from the excavations in arbitrary levels in order to establish a sequence or work out a pottery typology. Of the twenty sites excavated, six were large platform constructions with knolls and pyramids, five were habitation platforms, and nine turned out to be earth mounds, some of which had burials.

The major portion of the report is devoted to a detailed description of the actual excavations. A "Preface" and "Introduction" briefly outline the background which brought about the excavations and some of the problems encountered as well as the field procedure followed. In large sites, where possibly many rooms were superimposed, a step technique was used in which, instead of continuing directly downward, the excavations were extended down the slope. By this method it was possible to trace superimposed structures and find lower level rooms in areas which did not require excessive excavation.

Following the section on excavations are one on "Construction Analysis" and one on "Mounds." These constitute a form of summary and discussion of the preceding section. It is here that Bennett's three-part subdivision of the Gallinazo first appears — Gallinazo I being the earliest followed by Gallinazo II and Gallinazo III. It is not clear at this point on what basis other than "construction materials, plus certain other features" this division by sub-periods is made. Presumably ceramics played an important part, as is more clearly shown in the section "Sherd Analysis," and in the concluding one entitled "Reconstruction," where the three sub-periods are characterized in all their aspects. Of especial interest is the use of puddled adobe or tapia as the characteristic type of construction in Gallinazo I, whereas Gallinazo II is characterized by a variety of adobe types — the commonest being ball adobes. Gallinazo III employs "fairly consistently small rectangular, cane and plain, mold-made adobes." As brought out in the discussion (p. 105) tapia walls have a wide distribution but are generally assigned to a late (only slightly pre-Inca) period. Decorated walls, consisting of cutout geometric patterns in the tapia walls, are exclusively associated with Gallinazo I, whereas somewhat later, possibly associated with Gallinazo II, are mosaic decorations. Decorated walls of this type are "thus far limited in distribution to the Gallinazo Group."

Other interesting characteristics of Gallinazo construction within the three sub-periods are the lack of doorways and windows in Gallinazo I — presumably the rooms were entered through the roof — and their fairly common occurrence by Gallinazo III period along with open courts and the occasional use of stone in wall construction.

Following the sections dealing with construction are two other important sections — "Sherd Analysis" and "Grave Analysis." The sherds were classified in accordance with the types established by the Virú Valley Expedition. As a detailed description of these types has already appeared (Ford and Willey, *loc. cit.*), Bennett has reduced their description to a minimum with certain minor modifications in terminology "to conform to the materials found in the excavations at the Gallinazo Group." Analysis of the sherd material showed that types predominant in the earlier pre-Gallinazo periods still persisted in small quantities, with some types such as Puerto Moorin W/R, cut rims, and combined incised and punched designs being characteristic of Gallinazo I. Gallinazo II seemed to be in an intermediate position, with few, if any, truly diagnostic sherd traits. Gallinazo III continued some of the earlier types from Gallinazo I with a marked increase in the negative wares. It is these negative wares, especially Gallinazo Negative, which have led some authors to refer to the period as "Cultura Negativa," despite the fact that in the total number of pottery types and sherds recovered, the negative wares are greatly in the minority. A negative style, variant of the Gallinazo Negative, resembling the Recuay style, and the true Recuay three-color negative style are new additions to the Gallinazo III sub-period.

Analysis of the grave ceramics revealed several diverse forms — open bowls, ollas, collared jars, poppers, stirrup spout, spout and handle, spout and bridge, double jars and modelled forms. Sequence dating of the 112 graves was found to be difficult though all (with one or two possible exceptions) belonged to the Gallinazo period. Although grave ceramics were examined in several different ways, results were not too satisfactory. The popper and stirrup spout seemed to be new introductions in Gallinazo III and might suggest influence from the coastal Mochica culture to the north. Recuay negative painting suggest influences from that highland center.

Non-pottery artifacts were surprisingly rare considering the amount of excavating. A small section, "Other Artifacts," deals with the few pottery artifacts other than vessels and the even fewer non-pottery artifacts. Remains in these categories were so few that Bennett was only able to utilize them for rough comparative purposes, and they did not vitally affect the conclusions concerning the Gallinazo period mainly derived from ceramics and construction characteristics.

In the concluding two sections, "Comparisons" and "Reconstruction," Bennett considers the various facets of Gallinazo culture as uncovered by his excavations

in relation to earlier and later cultural manifestations in the Virú Valley as well as elsewhere in Peru. As would be normally expected, certain traits characteristic of the preceding Puerto Moorin period were found to carry over into the Gallinazo period, especially in its earlier phases, while in its later phases traits more diagnostic of the following Huancaco period were seen to be developing — possibly from direct influence of the early Mochica to the north.

In the final section, "Reconstruction," the possible origins of the Gallinazo culture are traced and each of the three sub-periods is summarized briefly in its entirety. Bennett discusses the possibilities as to whether the Gallinazo period developed directly from the preceding Puerto Moorin period or represents a break and new migration of population from elsewhere. On the basis of certain new pottery types and the exclusive use of tapia walls in Gallinazo I (a trait of an even earlier period than Puerto Moorin) Bennett feels for the Gallinazo period that "the total evidence for Virú Valley indicates a new migration of population from elsewhere outside, which replaced but did not totally eradicate the previous population" and that "the interruption was not too sharp."

Bennett states that the evidence is not conclusive, but indications are that this new "migration" or "influence" may have come either from some such highland center as the Callejon de Huaylas and/or the Cajamarca Basin, or from the coastal Mochica just to the north. There is no section on physical anthropology to show that a new population increment was added at this time. Ceramic and construction type changes could, therefore, be taken as indicative either of strong cultural influences or actual peopling of the area by new individuals. Some students may not care to go so far as Bennett does and postulate actual migration of new peoples into the Virú Valley at this time.

This report is an especially important one in that it rectifies an earlier misunderstanding of the stratigraphic position of the Gallinazo Culture. On the basis of his 1936 excavations, Bennett postulated a Post-Mochica and Pre-Tiahuanaco position for the Gallinazo period. But the stratigraphic evidence obtained by Strong and Evans during their excavations in 1946 definitely places the Gallinazo period in a Post-Salinar and Pre-Mochica position.

Cultural period designations as decided upon by the Virú Valley Expedition differ from those used elsewhere in Peru, though the periods themselves can be correlated with similar periods elsewhere — especially in the Chicama valley to the north. To assist in interpreting the various terminologies, I have made a simplified chart and thus, in broad terms, the various period designations for the Virú Valley can be correlated as follows:

Viru Valley	*Chicama Valley*	*Elsewhere in Coastal Peru*
Estero	Late Chimu and Inca	Inca
La Plata	Early Chimu	Local pre-Inca kingdoms
Tomaval	Coastal Tiahuanaco	Coastal Tiahuanaco
Huancaco	Mochica	Early Lima; Nazca
Gallinazo	Early Mochica and Salinar	Interlocking; Negative Horizon
Puerto Moorin	Salinar	White-on-Red Horizon
Guanape	Cupisnique	Coastal Chavin
Cerro Prieto	Pre-ceramic but agricultural	Pre-ceramic but agricultural
Pre-agricultural	Pre-agricultural	Pre-agricultural

Such a chart, of course, does not show absolute temporal relationships. Not all periods are estimated to be of equal duration; the earlier periods in general, however, are considered to be the longer as the various groups involved developed toward progressively more complex ways of life. Thus the Gallinazo period falls in a generalized stage that Bennett has elsewhere called "Master Craftsmen."[3] In this report he assigns 400 years to the Gallinazo period in the Virú Valley, and estimates that it fell between 300 and 700 A. D. Establishment of Carbon-14 dates may well show that this is a fairly close estimate.

Bennett's report on the Gallinazo Group is an extremely compact report filled with many more details, facts, and discussions — especially regarding house construction and the village "honeycomb layout" — than can be mentioned in a review. Written for specialists in the Peruvian field, it will be a most important reference and comparative work. Non-specialists will find it of interest in tracing the early beginnings of such traits as tapia walls, mold made adobes, pottery graters, settlement patterns, as well as many others. The addition of a trait list, comparing the development and cessation of many of the Gallinazo traits within the period by sub-periods would have been of value. For example, windows and doors are completely lacking in Gallinazo I but were fairly common in Gallinazo III. Since they are not mentioned for Gallinazo II, it must be assumed either that they are unknown for that sub-period or else a few were found and thus this trait first developed in Gallinazo II. When the rest of the series from the Virú Valley Expedition finally appears this fine report in conjunction with the others will prove to be a most valuable contribution to our understanding of a long stretch of Peruvian prehistory.

JOHN M. CORBETT
National Park Service
Washington, D. C.

[3] Bennett, Wendell C. "The Peruvian Co-Tradition" in *A Reappraisal of Peruvian Archaeology*. Mem. Soc. Amer. Arch., No. 4, 1948.

The American Indian. An Introduction to the Anthropology of the New World. CLARK WISSLER. New York: Peter Smith, 1950. xvii+466 pp., frontispiece, 82 illustrations, including map of North American Indian tribes. $5.50.

This is an offset reproduction of the third (1938) edition of Wissler's classic, published in 1917 by McMurtrie and republished in 1922 and 1938 by Oxford University Press after successive revisions by the author.

Offered as "a general summary of anthropological research in the New World," viewed not piecemeal but in terms of larger problems, the book was the first consistent and extended application of the culture area concept and a pioneer treatment of the Americas as a whole. As Kroeber remarked in his review in 1918, "The book traverses a long route; and there is scarcely a point touched but something is established which before was vague or obscure or postponed or unorganized."

Literature published through 1936 and some appearing in 1937 was made use of in the archaeological classification of the Americas into 24 areas (Chapter 15) and the treatment of chronology (Chapter 16). Despite great advances in archaeology in the last decade, the book has value as a summary of knowledge to 1938, and as a landmark in the history of New World anthropology it always will deserve a place on the student's shelf. Two of its virtues, its culturological approach and its bold statement and attack upon larger problems, make it a standard against which more recent textbooks could well be judged.

ROBERT ANDERSON
University of Michigan
Ann Arbor, Michigan

Cahokia Brought To Life. R. E. GRIMM, Editor. St. Louis: The Greater St. Louis Archaeological Society, n.d. [1950]. 72 pp., 8 text figures, Plates I-XXXII.

This publication is the outcome of a determination on the part of a group of collectors in the St. Louis area to preserve and disseminate the information acquired in years of activity at the most spectacular site in the area, the Cahokia mound group. It is made up of short contributions from various members of the Society, in every case prepared without professional editorial or archaeological assistance. A fundamental characteristic of the amateur is the pleasure which his archaeological work gives him, and, quite naturally, several of the contributions reflect this personal reaction. This subjective aspect, however, does not dominate the publication: systematic descriptions of artifacts, an analysis of relative frequency of projectile point forms, and a discussion of the difficult problem of the nature and relationship of the various components at Cahokia are ample evidence of a genuine interest in cultural problems. Many of the observations presented are not heretofore available in published form and are accordingly a valuable addition to the literature of the site. Professional archaeologists should also note the warning of rapid destruction at Cahokia and the appeal for systematic excavation in the near future.

ALBERT C. SPAULDING
Museum of Anthropology
University of Michigan
Ann Arbor

Archaeology of the Columbia-Fraser Region. MARIAN W. SMITH. The Society for American Archaeology, Memoir No. 6, 1950. viii+46 pp., 4 figs., 3 tables, bibliography, index.

When Marian W. Smith first started working with the Northwest Coast people of southern Puget Sound in 1935, she attempted to supplement the ethnological picture by turning to archaeology. Her disappointment was great when she discovered the dearth of archaeological information on the entire Columbia-Fraser region. In the course of subsequent work, Marian Smith had opportunity to examine archaeological material from the general area and to make a survey of the pertinent literature. "This review of the archaeology served to elaborate greatly the original over-simplified picture drawn by the most widely accepted of the early workers" (p. 1). Her present monograph is based mainly on the Bertelson Collection and upon published accounts of archaeological work.

The study begins with a detailed description of artifacts which were collected by Ernest Bertelson over a period of ten years (1930-1940) on a sandy spit at Suquamish on the west shore of Puget Sound, Washington. The collection, which contains nearly 1,000 items, consists for the most part of chipped stone implements. Unstemmed triangular points (a few of these with side notches) make up 63% of the total of 288 chipped points; 32% of the points are stemmed. There is a marked scarcity of leaf-shaped chipped blades. The collection contains relatively few ground stone implements. Only four of these are projectile points, fifty-six are adz blades. Marian Smith suggests that the deteriorating effect of salt water on bone, combined with wave action may account for the paucity of bone and antler tools, of which there are only twenty-five in all. The account of this collection is accompanied by two pages of line cuts, illustrating the more important artifact types.

An all too brief treatment of artifactual material found on the "McClallum farm" (*N.B.* The name is McCallûm) at Agassiz, British Columbia, about 80 miles east from the mouth of the Fraser, concludes the descriptive portion of this study.

Marian Smith then devotes some space to a criticism of classification systems of chipped points, in which she rightly calls attention to difficulties arising from the lack of complete standardization in the typologies now in use. However, she finds that despite these difficulties positive results can be obtained by a judicious use of

classification. This real value is demonstrated by the results of a comparative study of point types occurring in the various parts of the Fraser-Columbia region.

In the second half of the monograph Marian Smith proceeds to carry out her original objective, namely to offer "an archaeological framework for the southern Northwest Coast to be expanded or demolished as future data may dictate" (p. 4). Unfortunately, sound observations and conclusions in this part of the study are interlaced with ill-founded assertions and assumptions, and the argument is frequently weakened by a surprisingly uncritical reliance on the inconclusive and often highly questionable findings of early workers in this region.

Depending on the relative predominance of bone and stone tools, Smith divides the prehistoric cultures of this area into bone cultures (Early Bone, Late Bone) and stone cultures (Eastern Stone, Coastal Stone). One of Smith's chief "authorities" for making this unfortunate division is Albert Reagan, who from 1905-1909 was in charge of several Indian reservations on the Washington coast and who in 1917 published a brief sketch on the archaeology of western Washington and adjacent British Columbia. Recent excavations have revealed Reagan's pronouncements to be utterly misleading, at least as far as the Lower Fraser area is concerned. His statements regarding the archaeology of the Olympic Peninsula and of the Lummi-Nooksack region still await the checking of competent field workers. Meanwhile it might be well to regard them with considerable skepticism. Some of Smith's other sources are equally questionable.

Differences in the frequency of stone and bone tools do, of course, exist in the sites of this region, but in some instances the paucity or absence of bone is due to noncultural causes, and in certain others, specialized activities carried on at particular localities account for the predominance of bone and antler over stone implements. Furthermore, inadequate sampling by earlier workers may have resulted in giving a wrong impression of the character of certain sites. At any rate, there is no compelling evidence to warrant a *major* division of prehistoric Pacific Northwest cultures along the lines suggested in this monograph.

Because stratigraphic data were not yet available, individual sites on the Lower Fraser are treated as chronologically undifferentiated units. Students, however, will be puzzled to find "Eburne mound" listed as an example of the alleged "Coastal Stone" culture (p. 33) after "Marpole" had been cited as one of the major sites of "Early Bone" (p. 30), for "Eburne" and "Marpole" are two names for the same site.

In view of the still undeveloped state of Pacific Northwest archaeology, Smith's concluding sketch of the prehistory of this region and her attempt to link up early developments on the southern Northwest Coast with those in Alaska must be regarded as premature, although, to be sure, some of her conjectures are interesting and suggestive. For the time being, however, we might well heed Philip Drucker's warning not to soar off too readily into the realms of speculation and to emphasize again the urgent need for more rigidly controlled excavations in the Fraser-Columbia region as well as on the adjacent coast.

CHARLES E. BORDEN
University of British Columbia
Vancouver, B.C.

Cattle Point: A Stratified Site in the Southern Northwest Coast Region. ARDEN R. KING. The Society for American Archaeology, Memoir No. 7, 1950. xii-94 pp., 25 figs., 13 tables, bibliography.

This important monograph (published under one cover with SAA Memoir No. 6, "Archaeology of the Columbia-Fraser Region"), is the first detailed report of a systematically excavated site on the Pacific Northwest Coast. The Cattle Point site is situated on the south shore of San Juan Island and faces directly on the Strait of Juan de Fuca. An abundance of shellfish, of land and marine game, and the proximity of the site to the route of large salmon runs invited prolonged seasonal occupation each year over a long period, resulting in the accumulation of cultural deposits which attain a depth of over ten feet on the low bluffs in the western sector of the site. Physiographic changes, resulting in the loss of canoe beaching facilities and of shellfish resources, appear to have been contributory factors that brought an end to occupation, probably in protohistoric times. From the beginning to the climax of the occupation period the main campsites were on the bluff areas above the old beach. The old beach area was occupied only after the beach had become inactive. Excavations were made in the West Bluff and East Bluff areas as well as on the Old Beach below.

In spite of differences in the stratification of the three excavated areas, King found it possible to make what seem to be significant correlations. By combining the results indicated by physical and cultural stratigraphy he arrives at the following sequence of occupation periods:

1. Island Phase — Coeval with formation of first humus on the bluff areas. Economy better adapted to land than to sea resources.

2. Developmental Phase — First detectable use of shellfish. Increase in number of bone and antler artifacts adapted to exploitation of the sea.

3. Maritime Phase — Heavy shell deposit and artifact assemblage indicate full adaptation to exploitation of marine resources.

4. Late Phase — Heavy shell deposits on the Old Beach area below the bluffs. Possibly slight overlapping with Maritime phase. Many artifact types of previous phase absent.

The major portion of the monograph is devoted to detailed descriptions and discussions of artifacts occurring at the Cattle Point site. The artifacts are consid-

ered under two main headings: "Implements" and "Ornaments and Decorated Objects." Implements are divided into groups according to the material of which they are made. Tools of stone, and those of bone and antler form the two major groups, while tools of shell make a third. Implements are further classified as to technique of manufacture and as to form, and "A comparative archaeological and ethnological section [follows] the discussion of each artifact category in an endeavor to place it in time and space and to discover, as well, the uses to which it was put through a comparison with ethnological materials" (p. 13).

Other sections describe habitation features (stone slab structures, clay-slab bowl structures, stone boiling units, etc.) and burials. The final section is devoted to general considerations and conclusions. The results of the investigations are recapitulated and, with the aid of the new data, efforts are made on the one hand to give some historical depth to the trait lists of Drucker's three aspects of the Northwest Coast culture, and on the other to relate the four phases at Cattle Point with the postulated sequence of culture traits recently proposed by de Laguna for northern North America. And here, as in other parts of the study, the author proceeds with commendable caution, noting facts and pointing out possibilities without jumping to unwarranted conclusions. The appendix which contains discussions and distribution tables of animal remains (identified by Miss Phyllis Young, University of Washington) helps to supplement the cultural picture of the different periods.

Arden King's report is a sound and most valuable contribution to our dawning knowledge of Northwest Coast prehistory. His pioneer work will greatly facilitate the labors of other investigators in this region. The following criticism of certain aspects of the study do not detract from its merit as a whole.

The usefulness of classification systems, as Marian W. Smith has pointed out (SAA Memoir No. 6, p. 17 ff.), depends on standardization. If every new worker in this area proceeds to devise his own system of classifying projectile points without regard for the typologies worked out by previous workers, one of the main ends of classification, i.e. of facilitating horizontal and vertical distribution studies, will be defeated.

Arden King, obviously disapproving the criteria used in earlier point classification systems, works out his own typology. It "is based primarily on the form of the blade of the point since . . . this is the basic portion of the tool . . .; consequently, all points are classified on the basis of blade form, with each blade form possessing stemmed, non-stemmed, and notched types of points" (p. 13). Irrespective of whether one agrees or disagrees with the validity or suitability of these criteria, difficulties immediately arise from King's failure to define what he personally understands by "leaf" and by "triangular" forms. These are by no means concepts with a fixed and universally accepted meaning.

The situation becomes even more confusing when one compares King's leaf and triangular forms with those of other investigators. For instance, according to Strong, Schenck, and Steward's classification (*Archaeology of the Dalles-Deschutes Region*, 1930, p. 78) King's Figure 9, Number 20, which he includes among the "leaf-shaped" points would be type NBal or "triangular." Similarly King's "leaf-shaped" Figure 9, Number 3, corresponds to Collier, Hudson, and Ford's "triangular" type NBbl (*Archaeology of the Upper Columbia Region*, 1942, p. 58 ff.). Where such ambiguity of concepts exists, distribution studies lose much of their value.

The report contains seven profile drawings illustrating the stratification in various parts of the site. A greater uniformity in the devices employed to designate individual strata would have facilitated comparisons. Also the inclusion of a profile drawing of the stratification in at least one of the four long trenches up the steep face of the West Bluff would have been desirable.

The original position of artifacts is not indicated on any of the profiles. Artifacts are simply assigned to one of the four occupation periods without mention of whether they occurred early or late in a particular period, or whether there might be some doubt as to their provenience. There must have been borderline cases.

The identification of some of the artifacts may well be questioned. For instance, it is doubtful whether *all* the implements listed and described as chipped stone "projectile" points really are such. A number of these were probably knives, and some others scrapers. Again, there are two reasons why the large bone implement illustrated in Figure 13, Number 30 probably is not a harpoon point. The low enclosed barbs of this point could not possibly have held it in the body of an animal even when only a slight pull was exerted. Besides, the point appears to have no provision for the attachment of a retrieving line, as is commonly found on barbed harpoons on the Northwest Coast. This point, however, may well have tipped a lance for dispatching sea-mammals *after* they had been harpooned. King's "long, thin, slender bone rods" (Fig. 14, No. 12) which he intimates might have been used "for killing harpooned whales" (p. 48) were certainly far too small and fragile for this purpose. This and other evidence presented to suggest that whales may have been hunted is not convincing. The few whale bones that were found at the site probably were taken from beached animals.

King's explanation of why more shell artifacts were not found (p. 59) might be questioned. Shell implements, even when fragmentary, can be spotted among other shell remains when suitable techniques are employed, particularly since the majority of such implements are made of the distinctive shell of *Mytilus californianus*, which is fairly rare in this region. Adze blades, knives, scrapers, cutting blades for harpoons, and other objects of shell do occur in many sites of this region. Their omission would leave a serious gap in the cultural inventory of some of the prehistoric groups in this region.

Arden King has built a convincing case for his main thesis, namely, that the Cattle Point deposits indicate a gradual development from a simple culture pattern based largely on land resources to an economy which efficiently exploited the rich resources of the sea. Only future investigations will tell, however, whether the contrast between the individual periods is as marked as it appears, or whether some of the present gaps in the trait lists of the Island and Developmental phases will eventually be filled when a more complete record of the early culture has been obtained. Finally, the question as to whether the Island phase is actually coeval with the formation of the first humus, as King seems to assume, is one of the many problems of dating in our area, which perhaps can eventually be solved when facilities for age determination by radiocarbon content become more generally available.

The appearance of Arden King's report on the excavations at the Cattle Point site is an important event, for it marks the beginning of systematic and intensive archaeological work on the Northwest Coast. Only after many similar reports have been turned in will we be able to survey and to comprehend the complex course of culture history in the Pacific Northwest.

CHARLES E. BORDEN
University of British Columbia
Vancouver, B.C.

The Pottery of Marajó Island, Brazil. HELEN C. PALMATARY. Transactions of the American Philosophical Society, New Series, Volume 39, Part 3, 1949. (Philadelphia, 1950), pp. 261-470, 112 plates, 4 figures, 2 maps, 1 chart, appendix, bibliography. $3.00.

In the early 'forties Robert C. Smith, writing for the *Manual Bibliográfico de Estudos Brasileiros* (Rio de Janeiro, 1949) referred to "Miss Helen Palmatary, whose study of the ceramics of Santarem is the last word on the subject and who is now writing a book on Marajoan art and cultures to which it is related." This latter work has now appeared and it is, indeed, a major contribution to the archaeological literature of Brazil, whether the ceramics be treated as *objets d'art* or as cultural material to be used in historical reconstructions.

The brief introduction is followed by a discussion of the island of Marajó — its geography and climate, its history, and what is known of it archaeologically. Ethnologically, this very large island at the mouth of the Amazon is not well known although contact between Europeans and natives was probably established sometime in the first half of the seventeenth century. Archaeologically speaking, although Marajó attracted the attention of several scientists and explorers in the last century, here, as in so many corners of the world, the spectacular served as the focal point for their attention and the collection of decorated pottery was their principal goal.

Miss Palmatary's primary concern in the present work is the description of some five thousand ceramic artifacts which she examined in seven institutional collections and one private one, as well as through the study of a few photographs of objects from three other collections. After these ceramics have been classified according to Palmatary's scheme, selected objects have been lucidly described.

About the classificatory scheme some question may be raised not only as to its usefulness for further general studies but also from the standpoint of the bases on which it is founded. Decorative technique and form are the two major criteria, but the author's methods are nowhere adequately discussed. "In this study pieces have not always been classified on the basis of their most completely covered surface, but rather with regard to the one which is *most important* [italics mine] from a classificatory aspect and which affords recognition of all the major decorative techniques" (p. 284). Unfortunately too, "no record of the number of pieces examined was kept; therefore . . . the relative and impressionistic rather than the actual frequency" (p. 285) is represented.

In attempting to "suggest, as far as possible, the actual Marajoan archaeological situation as presented in the combined collections considered" (p. 285) the author is well aware of the lack of real representativeness in her materials. She herself says, "Archaeologists working in Marajó have collected few specimens of the plainer types of unpainted pottery . . . " (p. 285), and she does have relatively few examples of these wares to work with. The tremendous bias of the collections themselves is forcefully underlined when we recall that at one site on Marajó, Clifford Evans and Betty Meggers Evans report ninety-eight percent of total sherds as plain ware ("Archaeological Investigations at the Mouth of the Amazon." *American Antiquity*, Vol. XVI, No. 1, July 1950, p. 3). But this is no fault of Miss Palmatary's. She has very well described what she has had to work with, and the numerous plates, illustrative of a wide range of decorated Marajó pottery, are of excellent quality. One cannot help being impressed by the accomplishments of some prehistoric Marajoans in the fictile arts; students of primitive art will find many and varied uses for this book.

After describing the pottery, Miss Palmatary searches for "cultural connections between the Amazon and other archaeological areas on the basis of pottery form-types and decorative devices" (p. 331). Some may question that she "limited the study to the rather unusual or significant traits and tried to avoid those of a simple or general nature" (p. 331). Again, methodological notes would have been useful. The occurrence of "form-traits" and decorative techniques at Marajó as well as in other areas of South and Middle America, the Antilles, and Southeastern United States are verbally discussed as well as presented graphically in a "Correlation Chart" (p. 344). The author's search has been exhaustive, and she points to numerous similarities between Marajó ceramics and those from other areas. Miss Palmatary concludes, generally, that the greatest similarities to Marajó in South America are

found at Santarem and in Venezuela. She also emphasizes similarities between Marajó and Panama (Coclé), the Dominican Republic and other Antillean areas, not to mention similarities to the "Southern Mounds" of the United States.

In her earlier publication on Tapajos pottery (*Ethnological Studies* 8, Göteborg, 1939), the author was intrigued by certain similarities between Santarem pottery and some of that from the southeastern United States. In the present work she is still intrigued with these similarities — broadening the area to include Marajó, but in my opinion the problem of just how significant these similarities are remains unsolved. One has the feeling that she has taken too lightly the geographical and cultural gaps between the two areas (although she does, to be sure, mention them), and that she has failed to get to the root of the essential comparative approach. It should be pointed out that in her discussion, the author is fully aware of the fact that she is unable to place the materials in a chronological framework. The importance of this lack in the comparative part of the study is obvious, for completely different time periods may be involved in any given instance; and when chronology is known, some similarities which are typologically striking may prove to be fortuitous.

Since the writing of the book, stratigraphic work has been done in the Marajó area by the Evanses, and Americanists are awaiting the full publication of their findings. It is quite possible that with these and future systematic investigations on Marajó, and subsequent analysis of excavated materials, the pottery with which Miss Palmatary deals will take on added significance as it is more positively fitted into the picture of the island's prehistory.

In fine, *The Pottery of Marajó Island, Brazil*, can be highly commended for its discussion of the Island itself, for its clear description of the pottery studied, for the magnificent illustrations, for a good bibliography, and for a generally attractive publication (a few typographical errors notwithstanding). The value of the book would have been enhanced considerably by some methodological discussion, by a more exacting, precise and penetrating typological analysis, and by the inclusion of an index.

VIRGINIA WATSON
Washington University
St. Louis

BOOK NOTICES

The Kon-tiki Expedition. THOR HEYERDAHL. Allen and Unwin, London, 1950, 12/6., (the Book Society's choice); New York: Rand McNally, 1950, 235 pp., 18 pls. $4.00. (Book-of-the-Month Club selection.) English translation of the Norwegian *Kon-tiki Ekspedisjonen*, Gyldendal Norsk Forlag, 1948.

Not merely a fascinating account of an exciting voyage, this is a popular version of an ethnological investigation — an experiment which showed that voyages could have been made to Polynesia by prehistoric Peruvians in balsa rafts. A preliminary statement of evidence for Heyerdahl's theory that crossings of the eastern Pacific actually were made in that direction, not from the islands to South America, and that Polynesians are American Indians rather than Javanese, has already appeared: "The voyage of the raft Kon-tiki," by Thor Heyerdahl, *The Geographical Journal*, CXV, pp. 20-41, London, January-March, 1950. In this connection, see also George F. Carter, "Plant evidence for early contacts with America," *Southwestern Journal of Anthropology*, Vol. 6, pp. 161-182, Albuquerque, Summer 1950, the latest and fullest review of this fundamental aspect of the problem of trans-Pacific crossings in pre-Columbian times.

A Manual of Archaeological Field Methods. ROBERT F. HEIZER and others. Millbrae, California, The National Press, 1950 (Revised Edition), pp. vi+85. $2.00.

In this second edition of what is probably the best available field manual, the first edition of which was reviewed by Albert C. Spaulding in the April 1950 issue of *American Antiquity*, Vol. XV, No. 4, p. 351, the outline of surveying procedure has been simplified and a new section on techniques of dating various materials has been added. A modification and expansion of certain portions of the 1949 manual has also been published as *Methods for Archaeological Site Survey in California*, by Franklin Fenenga, Reports of the University of California Archaeological Survey, No. 5, 1949.

Bird's Eye View of the Pueblos. STANLEY A. STUBBS. Norman, University of Oklahoma Press, 1950. 122 pp., 25 pls., 27 figs. $3.00.

A vertical aerial photograph, a ground-plan drawing, and a concise text are given for each of the living pueblos of New Mexico and Arizona, with a general introduction on Pueblo Indian culture, particularly discussing architectural methods and town planning. Excellently organized and presented, this is a valuable survey and reference for students and specialists and is also of general interest for visitors to the Southwest.

An Analysis of Culture Change in the Ackmen-Lowry Area. JOHN B. RINALDO. Fieldiana: Anthropology, Vol. 36, No. 5, Chicago Natural History Museum, 1950, pp. 93-105. $0.25.

Seriation of pottery types from separate rooms or levels of sites in southwestern Colorado, presented in the form of a bar graph, gives more precise relative dating of structures and indicates trends and innova-

tions in pottery and other artifacts. Recently the same has been done for Mogollon sites in southwestern New Mexico by Paul S. Martin, John B. Rinaldo, and Ernst Antevs in their *Cochise and Mogollon sites, Pine Lawn Valley, Western New Mexico*, Fieldiana: Anthropology, Vol. 38, No. 1, 1949 (to be reviewed by Donald J. Lehmer in a forthcoming issue of *American Antiquity*).

The Quileute of La Push, 1775-1945. GEORGE A. PETTITT, Anthropological Records, Vol. 14, No. 1, University of California, 1950. pp. 120+vi, 7 pls. $2.00.

The sort of acculturation study which should be read by archaeologists, a very readable account of culture change among a group of human beings on the Pacific shore of the Olympic Peninsula south of Cape Flattery, Washington, with a historical as well as sociological and economic approach.

Studies in Ecuadorian Geography. EDWIN N. FERDON, JR., with the collaboration of Malcolm H. Bissell, in "Climates of Ecuador" and with an appendix by William C. Steere, "The Phytogeography of Ecuador." Monographs of the School of American Research No. 15; School of American Research and University of Southern California, co-publishers, 1950. pp. 86+ix, ethnic map, climatic map, 30 illustrations. $3.50.

A valuable study in human or cultural geography, with detailed basic data on Ecuador climate. The first section, "Notes to accompany a present-day ethnographic map of Ecuador," was published in *El Palacio*, Vol. 54, No. 7, July 1947. In the monograph, additions have been made to the ethnic map. Dr. Steere's interesting paper on plant geography was originally presented at the symposium on the phytogeography of South America in the New York meeting of the A.A.A.S. in 1949.

Area Research: Theory and Practice. JULIAN H. STEWARD. Social Science Research Council, Bulletin 63, New York, 1950. pp. 164+xvii. $1.50.

Appraisal of objectives and techniques of interdisciplinary "area research," by which is meant the simultaneous application to a selected region of the various fields or approaches of anthropology (social science), including language and economics and history as well as ethnography and sociology and psychology, rather than the broad scope of geography (human ecology). Emphasis on the application of anthropology to nonprimitive peoples, to the sociological problems of modern nations, is all to the good. Most archaeologists, however, will not linger for long over topics like "Sociocultural Wholes as Integration Levels." The term "cross-cultural" has now come into general use, apparently, to refer to the comparative method.

NOTES AND NEWS

GENERAL

The major emphasis in most areas continues to be salvage archaeology — not only the River Basin program, but also various other problems of archaeological surveys and salvage excavations in advance of construction (or destruction) projects. A striking example of this, and an important precedent for further similar work in the future, is the gas-line job in northern Arizona and northwestern New Mexico, described below under SOUTHWEST. Various other less extensive operations of the nature of salvage are also noted below.

At the meeting of the Committee for Recovery of Archaeological Remains (Major W. S. Webb, Chairman) in Washington, D.C., on November 16, Dr. F. H. H. Roberts of the Smithsonian Institution reported that 31 surveys of new reservoir areas had been made during the preceding 12 months, bringing the total of reservoirs surveyed to date by the Smithsonian Institution in the River Basin Program to 211, locating and recording a total of 2,638 sites. Of these about 500 have been recommended for excavation. Sixteen excavation projects have been carried on during the past year. The work of the past 12 months has been concentrated mainly in the Columbia and Missouri River basins. The sites range from early man to Indian sites of the Colonial period and historic (European-American) sites. In addition, numerous surveys and excavations have been carried on in the past year by other institutions, cooperating with the National Park Service in the River Basin Program.

The possibilities and importance of the archaeological work for the agencies engaged in controlling and developing the water resources of the country are once more suggested by findings at the Falcon Dam site (in southern Texas and norther Tamaulipas) regarding the climatic and erosional history of the lower Rio Grande, and by articles concerned with the use of such data for primarily archaeological purposes (e.g., Jack T. Hughes, "An Experiment in Relative Dating of Archaeological Remains by Stream Terraces," *Bull.* TAPS 21, 1950). Quite often it would appear that the archaeologist can do more precise terrace dating than has yet been done.

In work not guided by salvage needs, and also in situations where the organization of salvage programs on the basis of priority other than urgency of recovery is possible, a clear sense of problem is fairly generally evident. The objective is most often a problem of rather local or specialized interest — the filling in of a gap in knowledge, in either time or space, or the determination of possible interrelations between known complexes. Large areas that were very sketchily known only a few years ago, notably in the northern Plains and in the extreme Southeast, have had the broad picture outlined, or at least a tentative sequence set up as a working hypothesis. In other large areas, established outlines continue to be clarified and expanded.

Relationships between major areas that have largely been studied each *in vacuo* are receiving more and more attention — between the Southwest and the southern and western Plains, between the northern United States and Middle America, and between North America and adjacent Siberia.

The general subject of early man, of tracing down and dating what can be found representing the first groups of migrants from Siberia into northern North America and on southward, and any other paleolithic and mesolithic people of a reasonable antiquity, continues to occupy a top spot in many areas. For this aspect of North American prehistory no coherent picture nor tentative broad hypothesis has been established. This is undoubtedly one reason for the widespread emphasis on search for early man; the field is still pretty wide open and can be greatly affected by a single find. In this search some early material has been found, but in addition a great deal of extremely valuable work on local sequences of somewhat later material has been brought about (e.g., L. S. Cressman, "Archaeological research in the John Day region of north central Oregon," *Proceedings of the American Philosophical Society*, Vol. 94, No. 4, pp. 369-390, Philadelphia, 1950).

The skeletal remains of the "paleo-Indian" continue to be elusive. The putative specimens which turn up prove generally to be uncertain, except perhaps for one of the three Minnesota finds of a few years ago, the Browns Valley man. Even the famous recent find at Tepexpan in the valley of Mexico has been very seriously questioned (Glenn A. Black, "Tepexpan man; a critique of method," *American Antiquity*, Vol. XIV, No. 4, April 1949, pp. 344-346; Jesse D. Jennings, "On the validity of Tepexpan man," *Texas Archeological and Paleontological Society Bulletin* 21, Lubbock, Texas, 1950, pp. 105-110; review by Alex D. Krieger in *American Antiquity*, Vol. XV, No. 4, pp. 343-349, April 1950, and in *Boletin Bibliografico de antropologia Americana*, XII—1949, Mexico, 1950, pp. 278-285). Possible new finds, some of which will prove valid eventually, continue to be reported. A fragment of a human skull, heavily mineralized, was found last summer in the Cuitzeo district, northern Michoacan, without any positive association but in the close vicinity of the fossil elephant skeleton recovered in 1931-32 by Jose Corona Nuñez ("*Cuitzeo, estudio antropogeografico*," *Acta Antropologica*, II, 1, 1946), as well as the presumably later remains, reported by Gordon W. Hewes of the University of Southern California ("Some Lake Cuitzeo sites, Michoacan, Mexico," *The Masterkey*, Vol. XXIV, No. 6, pp. 179-182, November-December 1950). In this general connection, the interested reader is also referred to a review of St. Luis Aveleyra's *Prehistoria de Mexico* in the next issue of *American Antiquity*.

In the way of paleolithic American (early man or paleo-Indian) cultural material, far less rare than putative skeletal remains of its producers, only a few new finds are reported since last summer. Two are described below under the heading THE ARCTIC, and two others are mentioned under the heading SOUTHWEST.

It seems here appropriate to mention that for an issue or two we are going to try the system of leaving the items relating to EARLY MAN under their respective geographical areas, instead of grouping them in a separate section. No concomitant changes in the assignments of the Assistant Editors is being made as yet, however, because we are considering possible subdivision along the lines of the breakdown of NOTES AND NEWS items used in this issue, and we will probably wait and do all the juggling at one time. The basic reason for omitting a special EARLY MAN section is the frequent uncertainty whether a particular find is really "early" (there is no clear-cut definition anyway); furthermore, there are single sites which cover a range from undoubtedly very early to quite late periods, e.g., Ventana Cave in southwestern Arizona (the report on which very important piece of work, by E. W. Haury and others, was published in mid-1950 by the University of New Mexico Press and will be reviewed in a forthcoming issue of *American Antiquity*).

In addition, this arrangement will probably be more convenient for the editorial staff and for those readers who are interested in all findings and field work in a particular region. For those who are interested in keeping track of early man discoveries throughout North America (or rather, in all the Western Hemisphere), the topic will be summarized each time in this GENERAL section covering matters of special or interregional interest and any significant general developments or perceptible trends.

A continuing trend seems to be that toward local and regional organization for integrated effort and exchange of information. In the Northwest and the Plains, as well as the Southeast and the Southwest, regular field conferences have developed. The number of meetings one might attend is beginning to reach a literally staggering total. Regional and local periodicals continue to multiply. In the northern Plains, we now have the Plains Conference *Newsletter*, the *MRB News* of the Smithsonian Institution-National Park Service program in the Missouri River Basin, and others. The Plains Conference *Newsletter* regularly contains preliminary reports of recent field work and other valuable technical papers, as well as news notes. There are additional localized similar periodicals, also mimeographed in many instances, such as the *Museum News* of the University of South Dakota's W. H. Over Museum, edited by Wesley R. Hurt, the September 1950 issue of which (Vol. XI, No. 11) is a preliminary report on the Swanson site. Two new journals in the Southeast are described under the heading of that area below.

In addition to regular periodical journals, a most important development, suggested by L. S. Cressman and discussed at regional conferences in the past, has been given concrete form by James B. Griffin of the University of Michigan: a series of printed loose-leaf sheets on pottery types of the eastern United States. The first set, distributed in the fall of 1950, describes thirteen early types of the Southeast, with preliminary statements and bibliographies on fiber-tempered pottery, cer-

tain sand-tempered types of the Southeast, and fabric-marked pottery in the eastern United States, by Griffin and William H. Sears. The continued production of this series of type-descriptions, with cumulative additions and revisions, will be of the greatest value.

THE ARCTIC

Investigations of 1950 pepper the map of the American Arctic from southeastern Alaska to the north Canadian archipelago. In addition to the well-known slate-polishing peninsular or island Eskimo, a view is emerging of the flint-working "Paleo-Eskimo" who may have ranged farther inland, and of the much earlier makers of burins and channeled points who may or may not have laid the base for Eskimo culture.

Beginning at the south and working northward, we have the following field reports:

Frederica de Laguna, together with Catherine McClellan and student assistants F. A. Riddell and Lloyd Collins, focussed Tlingit ethnological data on archaeology in the Angoon area of Admiralty Island. Sites pin-pointed by migration legends proved to be uniformly small in size and lacking in the artistic elaborations of recent Tlingit culture. A site described in legends as a Tlingit fort gave evidence of successive habitation, the earliest relating to the time of only indirect European trade.

Wm. S. Laughlin, with Gordon H. Marsh, of Columbia University, and James Leach, of the University of Oregon, reports generous returns from the various efforts of his group in the Aleutians. Completion of a large cut across the Nikolski site yielded both labrets and polished or ground tools from bottom to top of a 19-foot deposit. Although artifacts change form with stratigraphic sequence, Laughlin reports "Paleo-Aleut skeletons all the way to the surface in this area making it apparent that the later Aleut population and culture did not immediately displace the earlier Paleo-Aleuts." Marsh secured linguistic evidence of considerable time depth for the Aleuts, and ethnological studies give a clue to prehistoric inter-island distribution.

Wendell Oswalt, of the University of Alaska, assisted by Mrs. Oswalt and Mr. and Mrs. Walter Arron, explored the crucial Hooper Bay region of the Bering Sea coast, test-cutting an 8-foot midden deposit in Hooper Bay Village. Little cultural change from the lowest to the recent levels indicates extreme conservatism in this populous but little-known area.

The Bering Strait Expedition (Rainey, Larsen, Giddings, and 9 student assistants) turned up new sites of Paleo-Eskimo at several points between Cape Prince of Wales and Norton Bay, and continued excavations at Deering, Cape Denbigh, and the Trail Creek Caves. New evidence of "Yuma" techniques appeared in the early man levels at the latter two sites — particularly at Trail Creek, where one cave deposit has a top layer of Ipiutak hunting equipment and more than a meter of earlier hunting manifestations in stratigraphy. Several large diagonally-spalled blades occurred near the bottom, along with antler and bone spear and arrow parts. Mesolithic parallels are implicit in decoration and slotting for microlithic side-blades on a presumed arrowhead. The thin culture level at the bottom of the Cape Denbigh site was further isolated in folds of large fossil solifluction lobes that point to a colder climate than that of the present time, thus adding geological to typological evidence of considerable age.

Credit goes to the U. S. Geological Survey for producing significant archaeological finds on the northern slope of Alaska during the summer of 1950. Guided by Ralph Solecki's 1949 discoveries, two parties recorded 70 more sites, principally chipping stations, situated along the west central part of the southern Foothills province of the north slope. A site yielding artifacts of the Denbigh Flint complex near Anaktuvuk Pass was found by Robert J. Hackman, and two Folsom points and polyhedral cores were found by Michael Lachenbruch on the headwaters of the Noatak River. These are post-glacial in time, since they occurred in morainal areas.

The Anaktuvuk Pass site, presumably the same as located by Mr. Hackman, was independently discovered by Wm. Irving, of the University of Alaska, as a result of information received from Eskimos. Irving's collection contains burins, lamellar flakes and small diagonally-flaked blades.

Henry B. Collins excavated at three sites near Resolute Bay, Cornwallis Island, N.W.T. The sites for the most part are late Thule, but one small house ruin was very early Thule, the material from it being identical with the lower level material at Collins' Cape Prince of Wales site in Alaska which represents the period when Thule had just emerged from Birnirk. Another small house structure yielded Dorset material, but with a Thule overlay. Wm. E. Taylor, a student of the University of Toronto, assisted in this work jointly sponsored by the National Museum of Canada and the Smithsonian Institution.

NORTHEAST

For the University of Toronto, J. Norman Emerson, with student help, excavated at a prehistoric Iroquois site on Balsam Lake, near the village of Coboconk, Ontario, during July and August. The site's location on the Trent water route from the Bay of Quinte to Huronia suggested that it might reveal possible relationships between the prehistoric Roebuck site to the southeast in Grenville County and historic Huron manifestations to the northwest.

An abundance of material was found, chiefly potsherds marked by the unusual occurrence of elaborate neck decoration, similar to that found on the distant Black Creek site, near Weston, Ontario. Other artifacts include trumpet-type pottery pipes, a fox-head effigy, side-notched flint projectile-points, and bone needles, beads and awls, the latter sometimes carved. An engraved bone tube with raised triangular designs is of unusual interest. A typical Iroquois longhouse site,

150 x 30 feet in size, was uncovered. The total pattern does not closely resemble any presently known Ontario manifestation, and Emerson suggests that this may be another of the new developmental stages of Iroquois culture which have recently come to light in Canada.

Frank Ridley of Islington, Ontario reports another discovery bearing on the complicated problems of Iroquois origins in Canada. He has found, at various widely separated places in Ontario, stratified sites on which historic Huron components overlie precontact manifestations of the same people, and beneath the latter horizon a still different Iroquois complex which he refers to as the Lalonde culture. This complex is also found on single component sites which are similar in location and size to the numerous Huron sites which are found in the same region. The dominant Lalonde pottery type has an elongated neck and boldly incised high collar. Accompanying artifacts are simple trumpet and ringed bowl pipes and side-notched arrowpoints. Definite ceramic resemblances exist between Lalonde and Onondaga in eastern Ontario, Quebec, and New York. Ridley further discerns a link with Neutral in southcentral Ontario in the variant pot and pipe types found on the Webb site in Huronia in which the major portion of the ceramic inventory is represented in the Lalonde complex. These discoveries of Emerson and Ridley emphasize the need for more extensive and intensive research on Canadian Iroquois stations before any far-reaching conclusions can be drawn concerning Iroquoian developmental sequences and relationships.

On the south shore of Lake Nipissing, Ridley excavated on a remarkable stratified site which showed a surface-to-base sequence of occupations indicated by the following materials: (6) Huron of the French contact period, (5) bar-stamped incised ware which may be late Algonkian, (4) Lalonde type of Iroquois ware, (3) Late Woodland with late Point Peninsula pot types, (2) Archaic type scrapers, and finally (1) fire-broken stones, jasper chips, and ashes in a deep deposit of brown sand.

Recent field work of the National Museum of Canada, at Ottawa, as reported in *The Museum News* for November 15, 1950, includes examination by Richard MacNeish of areas that will be flooded by projected reservoir construction near Lake Nipigon, Ontario, and investigation of Indian sites in southern Ontario by K. C. A. Dawson and Thomas E. Lee.

In New York, the field researches of the New York State Science Service and State Museum, aided by a grant from the Viking Fund and conducted by William A. Ritchie, assisted by Charles E. Gillette and Donald Lenig, contributed in some measure to the decipherment of early stages in Mohawk Iroquois development. Sites on Deowongo Island in Canadarago Lake, Otsego County, and on the Clock farm near St. Johnsville, in Fulton County, yielded potsherd series and other artifacts showing changes in ceramic styles and techniques of decoration which in turn tie into later known Mohawk types.

On the Clock site, deep grass- and bark-lined cache pits containing carbonized corn and refuse were excavated. The resulting series of bone, stone, and ceramic artifacts illustrates a late prehistoric stage in the development of Mohawk material culture. The corded technique of pot decoration found at Deowongo Island was no longer used, and the incising present on the enlarged collars was much less meticulously executed, although most of the same design motifs found at Deowongo Island and cognate early sites were present. Basal collar notches, absent or only faintly present in the latter ware, were boldly defined in the Clock series. Further work will be done on this site next season.

At Brewerton in central New York, another area of the Wickham site (excavated and reported by Ritchie in 1946) was examined, following the discovery of pottery of transitional character by test pitting in this portion of the site. The previously reported stratigraphy was confirmed and further examples of late Point Peninsula pot types were obtained from the lower horizon. These finds augment the scanty evidence of derivation of early Owasco from late Point Peninsula in central New York.

In the latter part of the season Ritchie conducted a survey of sites and collections in the Lake Champlain and Susquehanna River valleys. Alfred K. Guthe and Gordon K. Wright, of the Rochester Museum of Arts and Sciences, assisted by Leonard G. Wood, made an archaeological survey of the upper Genesee and Allegheny River valleys in western New York. Surface collections were made from seventeen sites, ranging from Laurentian to Iroquois.

A Hopewellian mound was excavated in the Conewango Creek valley, Warren County, Pa. Although it had been despoiled many years ago, three undisturbed burials with scanty grave goods, consisting chiefly of rude side-notched points, were found in the peripheral portion. The mound fill yielded similar projectile points, steatite pot fragments, and sherds of Vinette 1 and Geneseo cord marked pottery, as well as flake knives, including some of Ohio chalcedony.

During the past summer the Robert S. Peabody Foundation, represented by Douglas S. Byers, and the Robert Abbe Museum, represented by Wendell S. Hadlock, completed excavations at the Smith Farm, Ellsworth Falls, Maine. A number of new types, including a perforated ovoid atlatal weight, were added to the inventory from previous work. Again the lower levels produced a higher percentage of large, scraper-like cores and heavy flakes. Study and analysis of the materials and the data secured on the complex stratigraphy will be made during the winter.

A reconnaissance party consisting of Robert H. Dyson, Jr. and Theodore L. Stoddard, Jr. was sent out by the Peabody Foundation to test or excavate promising sites in the northeast. Near Richibucto, N.B., a post-contact site yielded an instructive assemblage of projectile points, hafted stone tools and potsherds. A number of sites were tested in Cobscook Bay, Maine; and near

Dennysville, on the Dennys River, Maine, a two-component site of different cultures was excavated.

According to Maurice Robbins, the Warren King Moorehead Chapter of the Massachusetts Archaeological Society continued its work for the fifth consecutive season on the Titicut site in Bridgewater, Mass. A striking ceremonial deposit, underlying a hearth, consisted of a mass of red paint enveloping a grooved axe, a plummet, and an engraving tool of white quartz, the whole enclosed in a stone cist whose cover was engraved with a snake or fish design encircled by cryptic figures. Robbins believes that this feature pertains to the protohistoric level of the site. Joseph Hartshorn, who has been studying the geology of the site, is expected soon to release his findings on soil and culture strata relationships at Titicut.

At the foot of Nippinnicket Lake, one of the headwaters of the Taunton River in southeastern Massachusetts, an important precontact stratified site has been under excavation by Richard W. Staples, Roland E. Engstrom, and William S. Fowler. The site is concentrated in an area which may have been a sandy island in the lake outlet before the Nunkatusset stream had cut its present channel. The lowest horizon pertains to Archaic times and indicates a sparse floral cover. The middle level, containing forest humus, produces a steatite bowl industry, while the upper zone of heavy humus yields pottery and evidence of agricultural activities.

Carnegie Museum of Pittsburgh concentrated its field work of 1950 in Greene, Washington and Fayette Counties in southwestern Pennsylvania, in Garrett County, Maryland, and in the West Virginia panhandle, with William J. Mayer-Oakes in charge of the party. One hundred thirty-two sites were located, plotted and recorded, and surface collections were made on most; five sites received preliminary excavations. Field examination of the materials collected indicates that each of the six major cultural horizons in the eastern United States is represented. Of special interest are a site in Beaver County, Pa., which produces pottery similar to the Vinette I type associated with a crude stone tool complex, probable prepottery sites in southwestern Pennsylvania and on the Ohio River in the West Virginia panhandle, and a site containing trade goods which may be documented as historic Delaware.

NORTHERN MISSISSIPPI AREA

Ohio. Late in September, a salvage excavation of an Adena-type mound was carried on in southeastern Ohio by Raymond S. Baby of the Ohio State Museum. Three extended burials and a cremation were found on the floor and in the mound.

Illinois. Melvin Fowler has been appointed Curator of Anthropology of the Illinois State Museum as of September 1st. The Illinois State Museum party, directed by Georg K. Neumann, recovered an interesting assemblage of material at their Hopewellian sites on the Wabash River in White County, Illinois, according to Thorne Deuel. The pottery called "typical" Hopewell was present in small quantities. Hopewellian stone pipes, mica sheets, cassis shell cups, ornaments and implements of native copper, and other grave associations are among the expected Hopewellian finds, but the great bulk of the pottery and possible other traits are Baumer or show Baumer influence.

Additional finds in the Hopewell sites in the lower Illinois River valley excavated by the University of Illinois party are reported by John C. McGregor. The Pool site near Chambersburg yielded several thousand sherds as well as pipes, ear spools, bone and chipped stone artifacts and several dog skeletons. The Ansell site, near Mosier in Calhoun County, yielded a quantity of charred corn. Fifteen additional sites were surveyed and collections made.

Minnesota. Lloyd A. Wilford, University of Minnesota, reports on excavations in the vicinity of Red Wing. One week was devoted to excavations at the Silvernale village site to obtain a larger sample of the shell-tempered pottery of Middle Mississippi type. A second week was spent in excavating a mound at the top of the Mississippi bluff overlooking Prairie Island. An Oneota village site is located on this island, and Oneota mounds are similarly situated, but this mound had no Oneota features and is presumably older than this cultural complex. It contained a badly disintegrated bundle burial but no identifying cultural material.

A month was then spent at Howard Lake, twenty-five miles north of Saint Paul, where the smallest of a group of three large mounds was excavated. In 1934 part of a village site on the opposite shore of the lake had been dug and a good sample of the pottery recovered. At that time it was classified as of the Malmo focus of the Mille Lacs aspect, but the closest relationship of the pottery is clearly with the Central Basin of Illinois. The mound belongs to the same culture, for the mound fill was rich in potsherds of that type, and contained other cultural materials, notably small stemmed arrowheads. Below the mound in an irregular pit were twenty-five badly disintegrated bundle burials with no cultural associations other than some red ocher.

In the southwestern suburbs of Minneapolis, a mound on the top of the bank of the Minnesota River was dug. It proved to have been badly disturbed but in the outer portion were both primary and secondary burials whose bones were fairly well preserved. No cultural materials were present. Halfway down the bank was a knoll with three shallow burials. All three were primary, in the flexed position, and with heads to the west. A stemmed arrowhead, a bone harpoon, and a pair of earrings, each pair consisting of two canine teeth of dog or wolf, were in association.

Two weeks were spent in digging a portion of the type site of the Great Oasis culture near Slayton. It yielded a good sample of pottery, artifacts, and storage pits.

Missouri. Carl H. Chapman, now on leave from the University of Missouri to study at the University of Michigan under a Horace H. Rackham Fellowship, has

reported briefly on the results of the University of Missouri Summer Field Session. Further excavations at Graham Cave in Montgomery County, Missouri, indicate that the Archaic horizon, believed to be at least 5000 years old, extends almost to the surface of the cave deposits on the west side. In addition to survey work, test excavations were made on two campsites, one of which was non-ceramic, in the Pomme de Terre reservoir area. In this area a long Indian occupation, from Archaic to historic times, is indicated. In the Kasinger Bluff reservoir area in Henry, Benton, and St. Clair counties, a house site and three caves were tested. More than twenty sites were located, and material recovered in the partial survey and preliminary excavations to date appears to indicate that the area was inhabited from very early times to the historic period. The Utz site, an Oneota manifestation in Saline County, was also investigated and a cemetery yielding fifteen burials was excavated.

Arkansas. Lynn E. Howard of the University of Arkansas Museum reports, in a letter of November 11, on the first summer field school, which was concentrated on the St. Francis River in northeastern Arkansas, working mainly on stratigraphic cuts in the Rose Mound and finding a Woodland occupation below a four-foot deposit of Mississippi material. He was also able to salvage late Mississippi burials in a cemetery exposed by a flash flood of the White River in north-central Arkansas.

SOUTHEAST

The first issue of *Early Georgia* (Vol. 1, No. 1, Summer 1950), a quarterly published by the Society for the Preservation of Early Georgia History (A. R. Kelly, Editor, University of Georgia, Athens), appeared last summer, containing five archaeological papers — site or survey reports — and brief notes. Another comparatively new Southeastern journal is *The Florida Anthropologist*, published at the University of Florida, Gainesville, by the Florida Anthropological Society. Volume I, in two issues (double numbers) appeared during 1948, and Vol. II, Nos. 1-2, in 1949. Volume II, Nos. 3-4, dated November 1949, consisting of six anthropological papers, was published in May 1950, and Vol. III, Nos. 3-4, dated May 1950, has just been received (John M. Goggin, University of Florida, is editor). The latest issue includes a survey by Goggin of the status of Florida archaeology as of 1950, with a bibliography of recently published papers. The treasurer of the Society is Ripley Bullen, Florida Park Service, Seagle Building, Gainesville, Florida, from whom back numbers (subscription, $3 a year) and other publications of the Society may be obtained.

SOUTHERN PLAINS

Karl Schmitt of the University of Oklahoma carried on further work during the summer of 1950 in sites of a Plains type, evidently of late-prehistoric date, on the Washita River in south-central Oklahoma.

Wilfred Logan of the University of Michigan made a survey in southeastern Colorado and northeastern New Mexico, where he collected, among other specimens, a number of sherds similar to certain Dismal River types. Transitions or interrelationships between the Plains and the Southwest form one of the significant objectives of study in this little-known area.

In westernmost Oklahoma and the Texas panhandle, Southwestern connections and possible influences are fairly well defined. A survey by Smithsonian Institution (River Basin) archaeologists in August of the Optima project, in Texas County, Oklahoma, found that no sites are located within the proposed reservoir area. Study of previously recovered material from the same vicinity, deriving from 1933-34 excavations by the University of Oklahoma at the Stamper site, has recently been published (Virginia Watson, "The Optima focus of the Panhandle aspect," Texas Archaeological and Paleontological Society *Bulletin* 21, Lubbock, 1950, pp. 7-68).

Alex Krieger has been studying pottery from stone ruins in Deaf Smith County, Texas, on the headwaters of Palo Duro Creek (an upper branch of Red River, not far south of the Canadian River Valley where the comparatively well known Antelope Creek focus is found). Among the sherds are many of Puebloan types, identified by Stanley Stubbs as covering a range in time between 1100 and 1700 A.D., and a comparably wide range in space — deriving from various source-areas throughout most of the New Mexico section of the Rio Grande drainage.

NORTHERN PLAINS

In the northern Plains, the River Basin Surveys group of the Smithsonian Institution, under the direction of Paul Cooper, and other cooperating organizations, carried forward actively the program of salvage excavations along the Missouri River, but the work in late summer and early fall consisted of continuation or completion of projects reported in the last Notes and News. A separate section on NORTHERN PLAINS is scheduled for a forthcoming issue.

SOUTHWEST

The 1950 Pecos Conference, the annual informal gathering of Southwesternists, was held at the Museum of Northern Arizona, Flagstaff, August 23-25, at the invitation of Dr. Harold S. Colton, Director of the Museum, with Erik Reed as program chairman. General sessions of informal reports of recent archaeological projects and work in progress in the Southwest were presided over by Dr. A. V. Kidder and Emil W. Haury; and Clyde Kluckhohn conducted the session of reports on current work in ethnography, sociology, and applied anthropology. A special session was devoted to general discussion of problems and methods of interpretation of human history and anthropological principles to younger students and the general public, with Paul S. Martin as chairman, and with Hamilton Warren of the Verde Valley

School and Dr. O. Meredith Wilson of the University of Utah as invited participants, Dean Wilson giving a final summing-up of the discussion. An open seminar led by Emil W. Haury concentrated on pottery-types of east-central Arizona and west-central New Mexico, especially the early brownware, discussed by Fred Wendorf, and the Reserve-Tularosa group of black-on-white types, presented by John Rinaldo. The next meeting, the 1951 Pecos Conference, is to be held at Point of Pines, Arizona.

Among the discoveries in the field of special interest which were reported to the conference was the finding of early man stonework, in purely lithic sites located on high bluffs, in the vicinity of Concho, Arizona, on the upper Little Colorado, by Mr. Tully Thomas of Concho. The sites were visited, and further collections made during the summer by Fred Wendorf and the late Kirk Bryan.

A very active archaeological survey and salvage program has been conducted by the El Paso Natural Gas Company, at the instigation of Jesse L. Nusbaum, along the pipe-line which is being installed from the San Juan Basin to California, as one feature of the permit from the Department of the Interior for crossing federal lands. The work is being done by Fred Wendorf, Paul Ezell, Wesley Bliss, William Bullard, and Francis Cassidy. More than a hundred sites had been located along the right-of-way between Farmington, N. Mex., and Williams, Ariz., ranging in period from presumed early man up to Pueblo IV (after 1300 A.D.), by early November; and salvage excavations had been made at eleven ruins. Material found in Arizona is being deposited with the Museum of Northern Arizona, Flagstaff, and specimens from New Mexico at the Laboratory of Anthropology of the Museum of New Mexico, Santa Fe. Examination of the pipe-line trench, subsequent to advance survey, and clearance on the basis of surface indications, discovered several buried sites, especially north of Gallup near the New Mexico-Arizona line, which otherwise would never have been detected or suspected. These buried sites also appear to belong to both early man and later periods.

Terah L. Smiley of the Laboratory of Tree Ring Research, University of Arizona, has completed a report on "Summary of Tree Ring Dates from Some Southwestern Archaeological Sites" which the Laboratory will publish. It includes 4,000 dates from over 300 sites. The Tree Ring Laboratory recently received the extensive tree-ring collections of the Museum of Northern Arizona, Flagstaff, and the Laboratory of Anthropology, Santa Fe. These two collections, added to the large collection already present, will give a fair sampling of tree-ring specimens from the entire archaeological Southwest, and will be available to qualified students of tree-ring research. A study of the unworked portions of these collections is part of the archaeological program of the Laboratory. It is hoped that whenever possible a sample of every tree-ring specimen collected in the Southwest can be placed on file in the Laboratory, so that it may better serve as a research center.

During the summer and fall, the work of A. H. Schroeder, National Park Service, at Lake Mead National Recreational Area, was concentrated on comparative studies pertaining to the Willow Beach excavations completed last spring. In the vicinity of Lake Mead, 250 sites have been surveyed and will form the basis for an archaeological map of the Area.

In October, under the direction of Charles Di Peso, the Amerind Foundation resumed excavations at Quiburi, a Sobaipuri-Spanish site in Cochise County, Arizona. In the summer the Amerind Foundation and the Harmon Foundation of New York joined in a survey trip into the Sierra Madre Mountains of Mexico, through the Guaraheo Indian country, where many photographs, both stills and movies, were made.

During the summer the University of Arizona archaeological field school at Point of Pines carried on the following excavations, under the direction of E. W. Haury: (1) clearing of nine pit-houses of an early Mogollon village, judged to have been occupied before 500 A.D.; (2) completion of a small ruin with surface masonry structures and pit-houses, and a nearby rectangular kiva, all of the Reserve Phase; (3) test excavations in nine ruins to determine best sites for future study; (4) extensive digging in the largest ruin in the area, occupied from 1200 to 1400. A sector of this village appeared to have been occupied by immigrants from the Kayenta region of northeastern Arizona, as indicated by pottery produced in the homeland, locally-made wares in the Kayenta tradition, and the presence of a D-shaped kiva.

In northeastern Arizona, Charlie R. Steen of the National Park Service completed in late September his excavations at a ruin in Canyon de Chelly which was being partially destroyed by erosion, concentrating on Basket Maker III-Pueblo II house remains. The remaining portion of the site is not seriously endangered. A large amount of interesting material was recovered.

In southwestern New Mexico, the work of Paul Martin and John Rinaldo in dry caves near Reserve yielded mummies and dry materials of the Mogollon culture. No reports have been received on the final results of the projects under way last summer to the north of the Chicago Museum of Natural History problem area, where two important expeditions had not completed their work at the time of the Pecos Conference to give definitive statements at that time—the Peabody Museum outfit north of Quemado, N. Mex., led by C. R. McGimsey, and the Dittert-Ruppe party south of Grants, N. Mex. The concentrated and coordinated postwar efforts in this large hitherto blank area lying between the Mimbres-Upper Gila section and the Acoma-Zuni section will certainly contribute heavily toward a better understanding of the general story in the Southwest.

In northern New Mexico, excavations by the Museum of New Mexico, in cooperation with the National Park Service, in the River Basin program, were carried on at a second large adobe pueblo ruin in the Chamita Reservoir (proposed) on the lower Chama River during August and early September, under the direction of

Stanley Stubbs with Lee Corrall as field assistant. Test excavations sampling this big site (roughly 650 by 250 feet) included the clearing of 15 rooms and of a deep kiva about 20 feet in diameter. The kiva and most of the rooms had been burned. On the floor of the kiva, in the fallen remains of the burnt roof, were at least 12 partially charred human skeletons. The period of the major occupation is indicated by pottery to have been between 1350 and 1550 A.D.

The excavation of a small glaze-paint ware site in Frijoles Canyon, Bandelier National Monument, was completed by F. C. Worman as a National Park Service project, during September and October, after the termination of the Adams State College field school from Alamosa, Colo.

The second of the 1950 summer sessions of the Texas Tech field school found three types of houses — jacal, pit-house, and upright-slab stone masonry — at the fourteenth-century site on the Bonnell Ranch at Glencoe, N. Mex.

NORTH PACIFIC COAST AND BASIN-PLATEAU

Charles E. Borden, of the University of British Columbia, with students Alan Bryan and William Drinkwater, of the University of Washington, surveyed a former Carrier village site on the Stuart River in interior British Columbia and partially excavated one of the ten rectangular shallow house depressions. The site, which, according to Father A. G. Morice, had been abandoned since 1745, yielded trade goods which suggest a later date of abandonment. Further work should provide an interesting record of Carrier Indian culture just prior to and at the time of first white contact. During the winter months, Borden is continuing his program of salvaging cultural data from sites in the Vancouver area, and is currently excavating on the Musqueam Indian Reserve near the mouth of the Fraser River.

J. D. Leechman, of the National Museum of Canada, made a survey of archaeological sites on the interior plateau of British Columbia.

L. S. Cressman, head of the Department of Anthropology at the University of Oregon, reports a new release of Carbon 14 age determinations by Drs. Arnold and Libby on Oregon cave material; sandals from Fort Rock Cave below the Newberry pumice yielded the oldest C14 dates of any artifacts so tested. Catlow twine basketry with false embroidery was associated with the sandals.

Richard D. Daugherty, of Washington State College, reports the finding of an early site in the Lind Coulee in eastern Washington. The site, buried beneath 6 to 15 feet of sedimentary deposits, yielded large keel-shaped scrapers, fragments of two single-shouldered projectile points, hundreds of small flakes, fragments of bone, some of which is mineralized, and well-defined charcoal areas. Geologist Charles D. Campbell, of Washington State College, has examined the site and equates the layer in which the cultural deposits occur with the Mankato advance.

Robert F. Heizer, assisted by A. Pilling, conducted the third University of California summer session field class in west-central Nevada near Lovelock Cave. The main excavation at Leonard Rockshelter (26PE14) produced, in the deep levels, artifacts of ancient perishable materials now dated by Carbon 14; the upper levels of the Leonard site produced materials which tie with the Lovelock Cave sequence whose antiquity is about 2500 years.

CALIFORNIA

Norman Gabel, assisted by Donald Lathrap and a student crew, carried out a joint excavation for the Berkeley-Santa Barbara Departments of Anthropology, University of California. A site at the mouth of Jalama Creek, south of Pompoc, in Santa Barbara County, was trenched and tested, yielding burials, house floors and numerous artifacts; curved shell fishhooks and small concave-based and base-notched points indicate Canalino occupation, with the possibility of an earlier phase occurring in the lower levels of the site.

A. Mohr surveyed the Bear, Burns and Owens Reservoir areas on the Merced River, and the Cachuma Reservoir area on the Santa Ynez River for the Smithsonian Institution (River Basin Surveys).

In the spring of 1950, a class in archaeological field methods of the University of California excavated at four coastal shellmound and interior valley dirt midden sites.

The University of California Archaeological Survey, with the assistance of A. E. Treganza of San Francisco State College, excavated a dry cave (site 4Ama3) which yielded numerous artifacts, a "mummy," and basketry. The Survey also conducted large-scale salvage excavations at the West Berkeley shell mound. Clement Meighan is in charge of excavations at Drake's Bay, Marin County, in sites which produce Wan Li period porcelain left among the Indians in 1595 when Cermeno lost his ship in that bay. Harry Riddell is conducting excavations in Inyo County for the Survey. Exploratory excavations, carried out in Moaning Cave, Calaveras County, by Wallace and Lathrap in September, have made possible the dating of Middle Horizon burials imbedded in solid travertine.

R. F. Heizer is carrying forward his project of a gazetteer of all tribal and village names and their variants listed for the California Indians. The first by-product of the program will be a revised map of California tribes with the map location of all village sites which can be accurately plotted. M. R. Harrington is currently excavating further at the Stahl site, Little Lake, in California. The University of Southern California, in cooperation with members of the Southern California Archaeological Survey Association, is continuing work on a deep shell midden south of Point Mugu, Ventura County, California.

SOUTH AMERICA

Peru. Wendell C. Bennett, Yale University, spent the summer of 1950 doing survey work in the Mantaro basin and digging at Wari (Huari). He reports that he dug 15 test pits in refuse accumulations at Wari, in refuse deposits varying from 50 cm. to 3.0 m. in depth. Almost 100,000 sherds were recovered; less than 5% of them were decorated. Pending final analysis of the sherd collections, it is clear that at least two periods of occupation can be distinguished at Wari. The earlier and dominant period is closely related to Coast Tiahuanaco, some sherds being identical with specimens from the Coast Tiahuanaco graves in the valley of Nazca.

Bennett also reports that Richard N. Adams has been making a survey in the vicinity of Muquiyauyo as a by-product of his ethnological work. Most of the sites studied appear to be late, the pottery consisting of a black on orange painted style and a few Inca fragments. Hans Horkheimer, of Lima, has also been doing survey work nearby in the Jauja area. The Museo Nacional de Antropología of Lima is continuing its program of excavations at Ancón; so far, the contents of more than 1,000 tombs, mostly of the Early Ancón and Epigonal types, have been added to the Museum's collections.

Ross T. Christensen writes that he has just about completed the excavation of a habitation site at Chusis, 4 kilometers north of Sechura in the lower Piura valley. The site is about 400 meters square and is perched on the point of a cliff some 18 meters above the floor of the valley. It was protected by a wall of clay on the desert side. A series of stratigraphic test blocks dug through the accumulation of refuse, sand and house foundations to bedrock revealed a continuous occupation from a time before any wind-blown sand had accumulated. The site is still occupied by Indians living in wattle and daub huts. Their culture does not seem to be very different from that of the prehistoric inhabitants of the same site. The greater part of the pottery is a nondescript red ware, but small quantities of polished black ware and a negative painted ware have been found also.

Colombia. Emil W. Haury, University of Arizona, carried out a program of survey and excavation in the Chibcha zone of Colombia between October, 1949 and March, 1950, assisted by Julio C. Cubillos of the Instituto Etnológico Nacional of Bogotá. Haury reports that his work consisted of extensive travel and survey on the sabanas of Bogotá, Fúquene and Sogamoso, and excavations at the National Archaeological Park at Facatativá; at Pueblo Viejo, near Manjui, at 10,000 feet elevation; and at Gachancipá. All of these sites are in southern Chibcha territory. The excavations were all stratigraphic tests in habitation sites and refuse deposits.

Contrary to expectations, only thin refuse deposits were located, and the material found is all late. It was possible to distinguish three periods: (1) pre-conquest; (2) colonial, about 1538-1820; (3) recent, since 1820. There are apparently regional differences between the sites of the first period, for example between Facatativá and Sogamoso. Pueblo Viejo, which is on the ancient Chibcha-Panche frontier, produced a new blended ceramic tradition. The pottery of the Colonial and Recent periods reflects a rapid cultural disintegration after the Spanish conquest. No antecedent or developmental stages to the historic Chibcha culture could be found.

An important result of the survey work was the identification of agricultural terraces on many slopes between Bogotá and Sogamoso; such terraces are known from the Sierra Nevada de Santa Marta and from southern Colombia, but had not previously been reported from the Chibcha area. A report on the season's work will be published in the *Revista del Instituto Etnológico Nacional* in Bogotá.

Venezuela. Irving Rouse, Yale University, and José M. Cruxent, Museo de Ciencias Naturales, Carácas, carried out joint excavations in three areas of Venezuela in the summer of 1950. Rouse reports the following results:

"In three weeks on the Peninsula of Araya the party dug primarily at the preceramic site of Manicuare. This is the first preceramic site to be investigated in the northern part of South America. The material found showed some resemblances to the Ciboney culture of Cuba but the differences probably outweigh the similarities. Two ceramic sites were also tested in this region. One indicates an extension eastward of the Tierra de los Indios style of pottery, hitherto known only from the northwestern part of Venezuela; the other contained historic pottery of a different style.

"At Barrancas, on the lower Orinoco river, five weeks were spent in excavating the site of Saladero. The earliest material here, underlying potsherds of the classic Los Barrancos style, was a red and white painted pottery very similar to that of the Cuevas style which is at the beginning of the ceramic sequence in Puerto Rico. This is the first time that Cuevas-like pottery has been reported from the mainland, and the discovery provides confirmation of the theory that the earliest ceramic culture of the Antilles diffused from South America. It is hoped that a C14 date for this diffusion can be obtained from the considerable amount of charcoal collected.

"The expected transition from Cuevas-like pottery to the classic Los Barrancos ceramics did not materialize either during the course of the Saladero excavations or in the accompanying survey of surrounding sites. From this circumstance it is inferred that the Los Barrancos style had its origin elsewhere, possibly on the island of Trinidad where such a transition does exist.

"The final week of the season was spent in excavating the site of Tocuyano Sur south of Quibor in the state of Lara. This site yielded negative painted pottery with no apparent relation to other known styles. The Tocuyano pottery is certainly older than the classic Tierra de los Indios pottery of Quibor and Araya, and may have been contemporaneous with the Cuevas-like pottery of the Barrancas region.

"The specimens from the Peninsula of Araya and Quibor have been left in Venezuela to be studied by Cruxent; those from Barrancas have been shipped to the United States for study by the writer. It is planned to prepare a joint report on the work in the three localities.

"On the return trip from Venezuela, the writer stopped off for three days in Trinidad to discuss with J. A. Bullbrook details of our proposed Trinidad publication. The next three days were spent with Père Robert Pinchon of the Seminaire-Collège at Fort-de-France, Martinique. During the course of this visit we photographed specimens in the Seminaire-Collège museum, visited eight sites, and made surface collections at four of them. A day in Puerto Rico made it possible to visit the new museum at the University and to study specimens recently excavated by its curator, Ricardo E. Alegría. Finally, five days were spent at the Conference on Caribbean Archaeology in Havana, Cuba."

Argentina (1949). Alberto Rex Gonzalez, of the staff of the Museo de la Plata, has sent the following information concerning archaeological activities in the Republic of Argentina during 1949, kindly forwarded by Gordon R. Willey.

Enrique Palavecino and Alberto Rex Gonzalez of the Museo de la Plata carried out intensive survey work in the Goya area of Corrientes Province in the months of December, 1948 and January, 1949. Sites originally excavated by Ambrosetti in 1894 were relocated and tested, at the confluence of the Penhuaho and Isoro Rivers. On the Parana Mini River several other sites were examined. Burials proved to be of both primary and secondary types. The culture type or group is the Malabrigo, characterized by abundant plastic representations, mainly zoomorphic, and by special pottery vessel shapes. Bone and horn artifacts were also common.

From March until May, 1949, another expedition took the field in Patagonia. This party was headed by M. A. Vignati who was assisted by Gonzalez. Work was carried out in collaboration with the Instituto de Estudios Patagonicos of Comodoro Rivadavia. Excavations were made on the Atlantic coast at Bahia Solano, some 30 kilometers north of Comodoro Rivadavia. These were shell midden sites, some of which contained graves. Bone and stone artifacts were collected. The importance of the Bahia Solano sites lies in the fact that they may be correlated with a series of raised beach lines.

Subsequent field investigations of this same party were in the territories of Santa Cruz and Chubut. Interesting rock shelters were discovered in the Charcamac Gorge on the banks of the Pinturas River. These rock shelters have pictographs representing human hands, guanacos, rhea and puma footprints, and full human figures. The most interesting pictograph was a complete scene representing a guanaco hunt by the surround method. In the same area numerous graves were found. Most of these were of the type covered by heaps of stones. Atop the Cerro Poivre site a great many individuals were uncovered in a mass or collective burial.

Studies under the direction of Jose Imbelloni were also made in the Santa Cruz and Chubut area by the Museo Etnografico de Buenos Aires. The principal objectives of this trip were ethnographical and somatological, but a number of the mass type graves were opened.

In December, 1949, a preliminary trip was made to the Tandil Hills, province of Buenos Aires, where several caves and shelters were found. These will be excavated in the near future under the direction of Oswald Menghin.

On January 1, 1951, the Division of Historical Research, Carnegie Institution of Washington, became the Department of Archaeology. Administrative offices remain at 10 Frisbie Place, Cambridge 38, Mass. H. E. D. Pollock is Director of the Department.

Dr. H. P. Mera suffered a stroke and was hospitalized at Santa Fe in November, but by early December was reported to be fully recovered.

VIKING FUND PRE-DOCTORAL FELLOWSHIPS IN ANTHROPOLOGY

The Board of Directors of The Viking Fund, Inc. established in 1946 the policy of making available a series of Viking Fund Pre-Doctoral Fellowships in Anthropology, by way of promoting research among younger scholars, to enable qualified students to undertake field work or to complete approved dissertations.

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5. A further recommendation would be for the applicant to have received a prior degree in some discipline other than anthropology, or be planning to secure such a degree, or its equivalent, in the course of his studies, and be a graduate of some institution other than the one nominating him for a Viking Fund Pre-Doctoral Fellowship.

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TABLE OF CONTENTS

		Page
The Denbigh Flint Complex	J. L. Giddings, Jr.	193
An Archaeological Survey in the Strait of Belle Isle Area	Elmer Harp, Jr.	203
Ancient Population Centers of Santa Rosa Island	Phil C. Orr	221
Gold Artifacts of Chavin Style	S. K. Lothrop	226
A Revaluation of the Old Copper Industry	Suzanne W. Miles	240
The Sickle in Aboriginal Western North America	Robert F. Heizer	247
Kirk Bryan	Frederick Johnson	253

FACTS AND COMMENTS

Some Characteristics of Mongolian-Type Lames	Ferdinand Okada	254
Notes on Soil Analysis and Archaeology	Ralph S. Solecki	254
Whistles from Arizona	A. V. Kidder	256
A Ball Court Located on the San Pedro River in Southeastern Arizona	Chas. C. DiPeso	257
Fluted Points in Ontario	Kenneth E. Kidd	260
Genuine Lost Color	Mary Butler	260
On the Interpretation of Faunal Remains	Douglas S. Byers	262
Fraser River Delta Archaeological Findings	Charles E. Borden	263
Snaketown IV vs. The Facts	Albert H. Schroeder	263
Stephenson's "Culture Chronology in Texas"	Alex D. Krieger	265
The Alfred Vincent Kidder Award		267

BOOK REVIEWS

Linne: El Valle y la Ciudad de Mexico	Kubler	268
Vasquez and Morley: The Maya Chronicles	Kelley	269
Roys: Guide to Codex Perez; Prophecies for Tuns in Tizimin and Mani	Kelley	270
Ford and Willey: Surface Survey of the Viru Valley, Peru	Evans	270
Ritchie: The Bell-Philhower Site	Solecki	272
Amsden: Prehistoric Southwesterners from Basketmaker to Pueblo	Taylor	273
Smith: Uaxactun, Guatemala	Wauchope	274
Bennett: The Gallinazo Group	Corbett	275
Wissler: The American Indian	Anderson	278
Grimm, ed.: Cahokia Brought to Life	Spaulding	278
Smith: Archaeology of the Columbia-Frazer Region	Borden	278
King: Cattle Point	Borden	279
Palmatary: Pottery of Marajo Island	Watson	281
Book Notices		282
Notes and News		283

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